Vol. XIX. Part 12.

NATIONAL MUSEUM OF VICTORIA

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The Journal of the Department of Agriculture of Victoria, Australia.

December, 1921.

PRINCIPAL CONTENTS

Weeds and Their Eradication

Field Day at Longerenong College

Standard Herd Test—Report, Sept. Quarter

Tobacco Seed Beds

Peach Growing Fruit Drying

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THE JOURNAL

OF

THE DEPARTMENT OF AGRICULTURE,

VICTORIA, AUSTRALIA.

CONTENTS.—DECEMBER, 1921.

		PAGE
Weeds and their Eradication	*H. W. Davey, F.E.S.*	705
Peach Growing	*A. G. McCalman*	715
Borers in Sugar Gums		721
Tobacco for Victorians—Seed Beds for Bright Tobacco	*Max Valentine*	722
Standard Herd Test—Report for Quarter ended 30th September, 1921		727
Annual Field Day at Longerenong College		738
The Geelong Calf Club	*J. S. McFadzean*	745
Grassing Golf Links and Recreation Fields	*H. A. Mullett, B.Ag.Sc.*	749
Fruit Drying for Home Use	*Miss A. Knight*	752
Cultivation of Flax		758
Wheat Competition—Conditions, &c., of the Horsham Agricultural Society's Competition		760
A Handy Feed Trough for Cows	*R. C. Lorimer*	762
Test the Bull	*R. T. McKenzie*	763
Orchard and Garden Notes		764
Reminders for January		766

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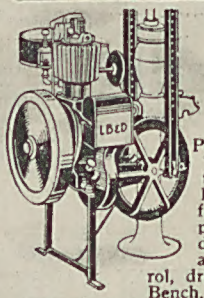

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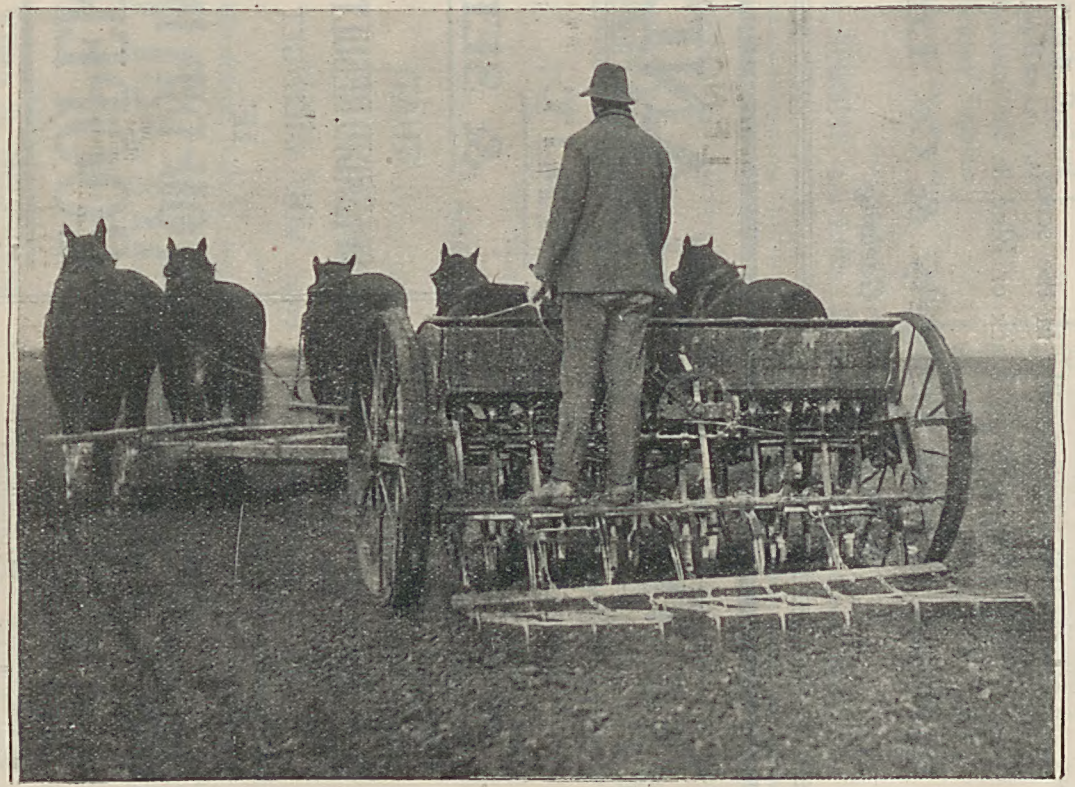

This photograph was taken at the Longerenong Agricultural College, Dooen, and shows a student driving a combined rigid tyne scarifier and grain and fertilizer drill. A light stump-jump harrow is also attached, which effectively levels off behind the drill. This economical system of cropping is largely adopted in the Wimmera and other grain-growing districts. The thorough stirring of the soil at the moment of planting is said to be very efficacious in promoting germination and strong growth. The implement is the invention of an Australian farmer and is manufactured at the McKay Sunshine Harvester Works.

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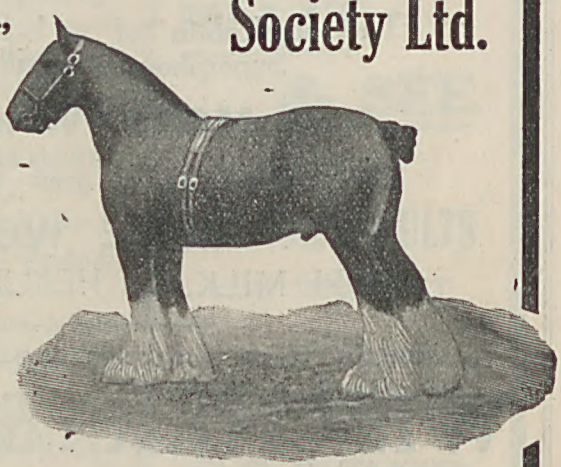

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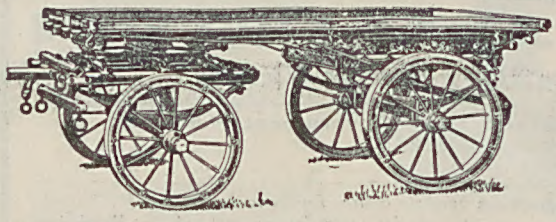

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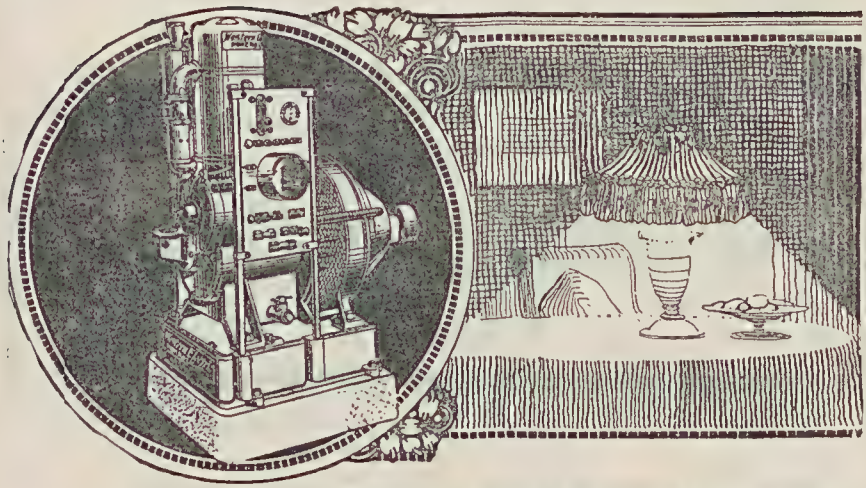

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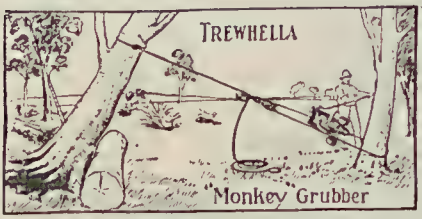

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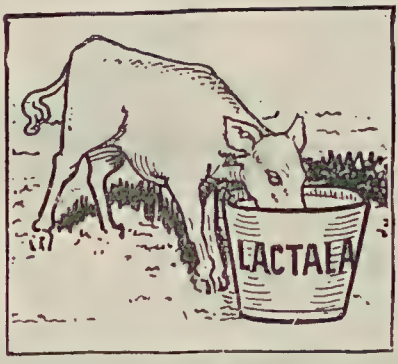

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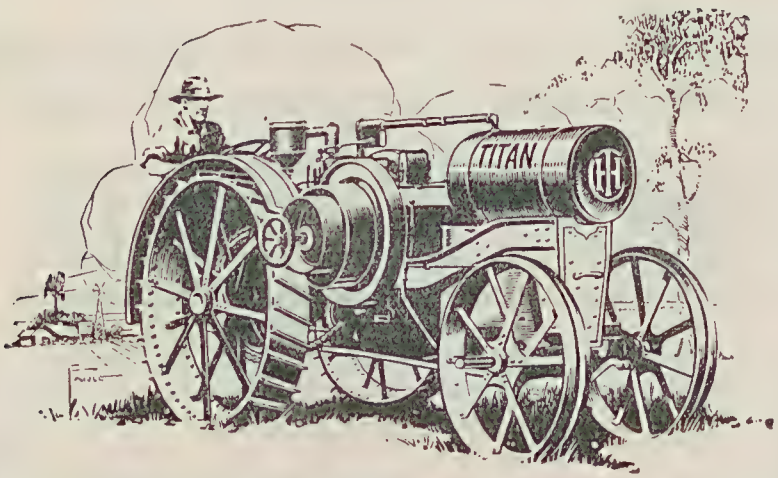

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WEEDS AND THEIR ERADICATION.

By H. W. Davey, F.E.S., Orchard Supervision Branch, Department of Agriculture.

(Continued from page 664.)

Hand-pulling Weeds.

This is often a most effective means of getting rid of strong-growing plants, especially if the work can be carried out shortly after good soaking rains have fallen, as then the maximum of roots may be withdrawn from the soil with the minimum of breakage. In hand-pulling such weeds as Stinkwort (*Inula*), care should always be taken to protect the hands and arms from contact with the plants, by wearing gloves and keeping the shirt sleeves buttoned at the wrists. Neglect of these precautions often gives rise to most distressing skin troubles.

Pulling up plants that possess running roots, such as those of the so-called Canadian Thistle, does little towards checking them, as when they are pulled they usually break off at the point where they join the horizontal root stems, leaving the latter uninjured. These shortly afterwards send up fresh stems to replace those broken off. The roots are often too deep in the ground to be reached by the plough, therefore, if cultivation is carried out, it should be frequent enough to prevent the formation of leaves, and thus gradually starve the roots.

Killing Weeds by Chemical Applications.

Some of the most troublesome plants can be effectively dealt with by means of arsenical preparations; but, unfortunately, there are often serious drawbacks to their use. Stock must not be allowed on the treated land until after a subsequent heavy fall of rain. This may mean keeping a large area out of use for a considerable time. The only alternative is to fence off the treated portion.

The present price of arsenic is very high, and the charge for transport of water for its dilution is usually so heavy as to make the cost of

liquid applications on steep land prohibitive. On land easily accessible and possessing a handy water supply, the use of arsenical preparations becomes of great value, being especially useful as a quick and effective means of destroying all top growths, and thus preventing the formation of seed. This work is often a matter of extreme urgency when seeds are reaching maturity, and arsenic can usually be sprayed over such plants in much less time than would be required to hand-pull them. Further, the spraying will probably be more effective. In the case of perennial weeds, if subsequent applications were given so as to destroy all new growths as soon as they make their appearance, the spraying would have the same starving effect on roots as would summer cultivations.

Salt.

Salt used as a herbicide is often of special value on steep or stony land owing to the fact that it can be applied in a dry condition, which overcomes the great difficulties always associated with liquid applications on this class of country. Salt, as is well-known, is a deliquescent substance absorbing moisture from objects with which it comes into contact. It is thus very effective as a weed killer, and is best applied during hot weather, when its effect on succulent plant tissues is rapid, especially so if the plants have first been mown or bruised. The fact that it is not necessary to remove stock from land being treated with salt is much in its favour; the presence of stock is, indeed, rather an advantage, as in their endeavour to get at the salt they injure and bruise the plants, thereby making them still more susceptible to the salt's action.

In tests with salt on St. John's Wort, carried out at Bright, the weed was first mown. In one test the material was boiled and applied warm; in another, it was strewn broadcast and then watered; and, in another, was left dry. The latter gave much the best results.

Sulphuric Acid.

Sulphuric acid is an expensive chemical, the cost of treating an acre being £22. Experiments with it against St. John's Wort were not effective, the only result being a temporary check, as in a very short space of time fresh shoots made their appearance, thus showing that the underground parts had not been injured to any great extent.

Crude Petroleum.

Tests made with this material at Bright gave some excellent results, many St. John's Wort plants being killed outright with one application. This chemical is slow in its action on most plants. The best results were obtained when it was applied during hot, dry weather.

Crude petroleum is best applied by means of a high-pressure pump, as this enables the oil to reach every part of the plant above ground; this object cannot be attained if a low-pressure machine is used.

It is very important to first strain the petroleum through bagging before putting it into the spraying outfit. This chemical should prove very useful as a herbicide; and, if applied under high pressure, the oil is atomized, thus giving it greater adhesive power to under surfaces of leaves, as well as making a great saving in the amount of oil used per acre.

Soil Improvements.

Some plants dislike lime, and their presence indicates that the soils on which they are growing are deficient in this mineral. Such plants as Spurrey and Sorrel will usually be found on land that has a low lime content. Lime applications, while lessening the vigour of these weeds, favour the growth of more useful plants. Draining surplus water from land encourages the better-class herbage while discouraging those plants that thrive best in acid soils.

St. John's Wort (*Hypericum perforatum*, L.)

This most pernicious weed, which is proclaimed under the provisions of the Thistle Act as a noxious weed for the State of Victoria, first made its appearance in Victoria about 40 years ago, having been raised from seeds said to have been obtained from Germany for medicinal purposes, and planted in a small garden facing the Harrietville-road, near Bright, whence it has spread over thousands of acres.

The members of the St. John's Wort family *Hypericaceæ* are mostly showy plants, and of the extensive genus *Hypericum* probably a hundred species are known. All of them, with one or two exceptions, have yellow flowers, and most of them will grow from cuttings. The pest species *H. perforatum* has a wide range, being indigenous to Northern Europe, extending through Siberia into China. This plant is a perennial, usually growing to a height of 2 ft. 6 in., but occasionally, under favorable circumstances, reaching to a height of 5 feet. It produces numerous flowers of a bright yellow colour; these, later on, form three-valved seed capsules, each containing a great many very small seeds. The branches grow opposite each other, as do the leaves; the latter are small, having smooth edges without stalks, and are of an elliptic oblong form, about ½ inch long. They are copiously supplied with oil glands, showing as pellucid dots on the surface. It is from the presence of these oil glands that this plant has been given its specific name of *perforatum*. When held against the light, these oil glands give to the leaf the appearance of having been pricked or perforated by a needle point. This feature affords one of the most ready means of identifying the plant.

Although, at first thought, the spread of St. John's Wort has been remarkable, it is not surprising if consideration be given to its great reproductive powers, a single plant being able, year after year, to ripen thousands of seeds. These, on account of their very small size, are easily carried and dispersed by all manner of agencies, of which probably stock movements, distribution of farm produce, and flowing water are the most important. In addition to its great seed production, the roots possess wonderful vitality, any small portion seeming to have the power to develop a new plant, and that in a very short space of time. The question is often asked, "Will St. John's Wort grow itself out?" but the fact that it is still in possession of land it has occupied continuously for the last 40 years proves rather conclusively that little hope can be entertained that it will do so. In any case, it would be too long to wait for such a desirable event taking place. In the issue of this *Journal* in November, 1905, page 625, a map, prepared by the present writer, was reproduced. It showed the localities that were at that time known to be more or less infested by St. John's Wort.

During the sixteen years that have elapsed since the map was prepared, the weed has so spread that many new areas could now be added to that map, each of which is a new centre for the further spread of this most pernicious plant.

Fig. 1.—St. John's Wort (*Hypericum perforatum*, L.)

Unfortunately, St. John's Wort has its strongholds in the wild alpine country situate on both slopes of the Australian Alps, it having crossed these mountains many years ago. It is now working its way

Fig. 2.—St. John's Wort showing Seed Vessels.

into Gippsland by means of the contributing streams of the Mitchell River, so that already it has overrun many thousands of acres on the watershed of that river.

Various chemicals have been tried on this weed with more or less success, but the great trouble is in keeping land clean after it has been freed of this pest; land being so easily re-infested, either by dormant seeds in the ground or by fresh supplies of seed carried from adjoining infested areas. In spite of the wonderful vitality of St. John's Wort and its great adaptability to its environment, the fact was noticed that it was being suppressed by strong grasses in places where the latter had reasonable protection from rabbits. This weakness has raised the hope that its so far triumphal march may be stopped by the planting of suitable grasses.

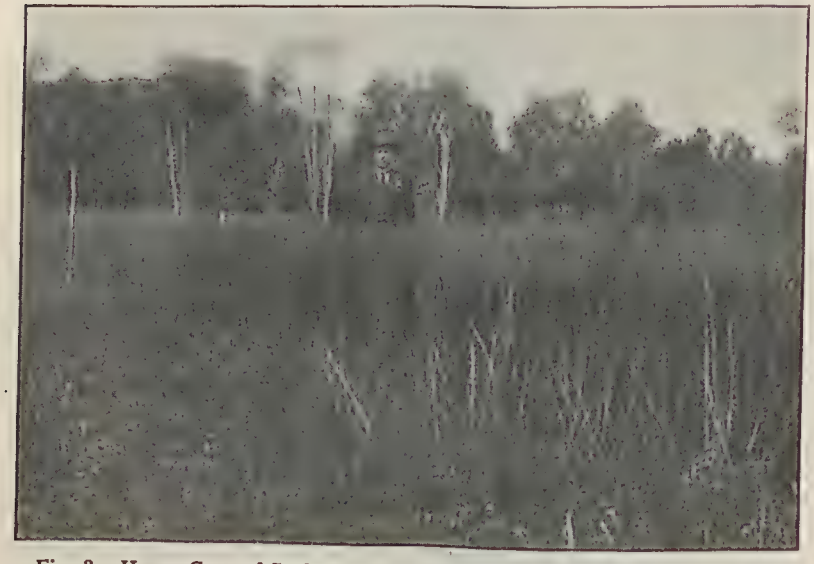


Fig. 3.—Heavy Crop of St. John's Wort, Morgan's Creek Plantation, Bright.

For the purpose of testing the ability of grasses to arrest the spread of the weed, the present Government granted a small sum of money, and permission having kindly been given by the Forests Commission to utilize small areas of land in the Pine Plantations in the Bright district, a commencement was made in 1920 at the Morgan's Creek Plantation. This plantation is very heavily infested with St. John's Wort, and the first operation consisted of burning off, at the end of March, the mass of old flower-stalks. The plants carried a mass of seed vessels, and an immense quantity of seed was destroyed at the time of burning off. The land then received one shallow ploughing and harrowing. As is well known, one cultivation does little injury to this plant, but rather increases its vigour, so that the cultural methods employed could not be said to have weakened the plants, and such was not hoped for.

On measured plots, various grasses were sown, some on 15th and 21st April, 1920, others on 2nd September of the same year. Some of these grasses, from various causes, failed completely; others, again,

have made excellent growth, and success appears to be assured. Of some of the grasses it is yet too soon to speak with authority as to their prospects of being able to completely suppress St. John's Wort. But, judging from what has already been demonstrated, the writer feels safe in saying that on land which can be ploughed there need be no great difficulty in establishing grasses capable of wholly smothering it.

It should not be forgotten that the land employed for these tests had grown very heavy crops of St. John's Wort for many years, and was in a very sour condition. In addition, it carried a large excess of magnesia over lime. If the land had been first sweetened by means of a summer fallow, together with a lime dressing to correct the excess of magnesia, and later given the help of a little artificial manure, it is

Fig. 4.—Morgan's Creek Plantation.—Grass protected from rabbits crowding out St. John's Wort.

probable that most of the grasses would have responded to such treatment. In these tests, however, no manures of any kind were applied, nor was the ground rolled after the seed was sown.

Fig. 1 illustrates portion of a flowering stem of St. John's Wort with one of its peculiar three-valved seed vessels. On the right of illustration is shown a small piece of severed root which has produced a new plant.

Fig. 2 illustrates a complete plant in seed.

Fig. 3 shows a heavy growth of weed on land that was afterwards used for grass tests. The old flower stems have been removed from the foreground in order that the density of the standing weed may be shown.

The ability of strong-growing grasses to force back and ultimately suppress the weed completely is well shown in Fig. 4, where kangaroo and other grasses are gradually displacing it. Kangaroo grass is doing

especially well in all the pine plantations, often reaching a height of 5 ft. 6 in. or more.

The plot of Subterranean Clover, *Trifolium subterraneum*, which was sown on the 15th April, 1920, made excellent growth and completely held St. John's Wort in subjection during the following spring months. After the clover had died down, the ground was for a time quite free

Fig 5.—Subterranean Clover Plot.

Fig 6.—Clover Plot looking towards Ovens River.
(Heavy growth of St. John's Wort outside fence.)

from any growth of the wort, but, later, stems of this plant were becoming numerous, showing that its roots were as yet little weakened by the clover. The first good autumn rains soon altered the appearance of the plot, as the clover came again very rapidly from its underground seeds, and soon covered the new growths of the wort. This can be seen by referring to Fig. 5, which shows how the luxuriant clover

growth has again buried the wort, as it did the previous season. This photograph was taken on 25th October, 1921.

Fig. 7.—Morgan's Creek Plantation.

Land previously carrying heavy crop of St. John's Wort sown with Kentucky Blue Grass on 15th April, 1920. Practically no wort now showing.

Fig. 8.—Another view of the Kentucky Blue Plot.

(Note dense mass of St. John's Wort close to trees just beyond edge of plot.)

The drawback to using Subterranean Clover as a smother crop is that it gives the wort an interval of breathing space before it again closes over it. Whereas with grasses, these maintain a very tenacious

hold, not relinquishing their grip on the wort at any time. The mass of the weed growing among the pines offers a good contrast to the clover plot with its freedom from this plant.

Fig. 6 gives a view of the clover plot looking towards the River Ovens. This also shows the heavy growth of St. John's Wort outside the fence of the plantation. In the foreground of the picture is a travelling bag, which gives an indication of the height of the clover, and it was only by placing the bag endwise that it could be seen at all.

Fig 7 illustrates a plot of Kentucky Blue Grass (*Poa pratensis*), which shows how completely St. John's Wort is being controlled by this grass. The plot was sown on 15th April, 1920, with seed at rate of 30 lbs. to the acre. When recently inspected the wort was barely showing, and even then only as weakly shoots at scattered intervals.

Fig. 8 is another view of the Kentucky plot. This photograph was taken close up to the edge of plot against the pine trees, and affords a good contrast by showing the dense mass of St. John's Wort growing among the trees, and the absence of this plant in foreground of picture. The grass is now well established, and it would be a decided advantage if the plot could be grazed by stock, as by this means any weak shoots of the wort would be eaten off with the grass, and the complete passing out of the former plant expedited. There need be little anxiety that dormant seeds will have any success against this grass in view of the fact that the roots of old-established plants have so far failed in competition with it.

(To be continued.)

WATTLE BARK.

Japan and some parts of China use Natal bark, but in southern China the Chinese tanner uses what I took to be mangrove bark, same as is used all over the Malay Peninsula. At Singapore, there is a very large consumption of mangrove bark, 11,000 tons a year. I personally went out to inspect tanneries and to see for myself what they use and how they use it. The Chinaman is wedded to his primitive methods, and it was with great difficulty that I got two tanners to agree to make a trial with Natal bark, which is to be sent them free of charge. A good effort should be made to convert the Chinese in these parts. In Burma I found they use native products called *Cassia auriculata* (*Chigingat*) bark, also Teri pod shells. Here, also, I arranged to have samples of Natal bark tested.

In India and Ceylon they use two kinds of native bark, and there is no prospect of business at present. If properly demonstrated to them that our bark contains a larger percentage of tannic acid, which is after all what counts in the tanning, we may gain a footing. The Chinaman is apt to be carried away by the bulk of wood per ton rather than rely on the percentage of tanning properties. Here, in India and Ceylon, they also use the native bark; they only half tan the hides, which are then exported to Europe, there to be finished to suit the requirements of the trade.

—[Extract from a Report on Markets for South African Produce, *South African Journal of Agriculture.*]

PEACH GROWING.

(Continued from page 667.)

By A. G. McCalman, Orchard Supervisor.

Manuring.

Owing to the variation in soils no hard-and-fast rule can be laid down for manuring peach trees.

Young plantations usually require no manuring. But except on rich land, after a few crops have been taken off the trees, it becomes necessary to add manure in order to keep the trees vigorous and capable of bearing fruit of the best quality. The essential elements which must be present in sufficient quantity are phosphoric acid, nitrogen, potash and lime; all others required by the tree usually being in excess of requirements need not be taken into consideration.

Stable Manure.—There is no better manure than well-rotted stable manure, as besides containing the necessary elements mentioned above its use adds humus or decayed organic matter to the soil. The increase of the humus content of the soil adds to its power of retaining moisture, improves its mechanical condition, and increases bacterial activity. Most of the soils in the northern districts are deficient in humus, and the frequent cultivation necessary in the orchard increases this trouble, so that the addition of humus in some manner is essential to success.

As stable manure is seldom available in sufficient quantities, green manuring, with the addition of artificial fertilizers, should be used. Stable manure should be spread over the land in the late winter, and ploughed under, so that the spring rains may complete its decomposition, and render it available for the roots of the trees. Five or six tons of stable manure to the acre is a good dressing, but for soils very deficient in humus a considerably larger amount should be applied.

Green Manuring.—The most suitable crops to grow for green manuring are leguminous plants, such as field peas, vetches, lupins, &c., for the reason that these plants act as hosts for colonies of bacteria which have the power of obtaining nitrogen from the air. This nitrogen is left in the soil, and is made use of by the roots of the trees. If the roots of a leguminous plant, such as clover or lucerne, or those mentioned above be examined, a number of nodules will be seen on them; these contain the colonies of nitrogen-gatherers.

The field pea is the crop generally favoured for green manuring, and this should be sown in the autumn, at the rate of 2 bushels to the acre, along with 2 cwt. of superphosphate and bone-dust mixed. The fertilizer gives the peas a good start, and, with ordinary weather conditions, a heavy crop of peas should be ready for ploughing in during September, when they are in blossom. In a bulletin issued by the Department of Agriculture of New South Wales, Mr. F. B. Guthrie states that such a crop of peas adds, at least, 100 lb. of nitrogen to the soil per acre, equivalent to the addition of 4 cwt. of sulphate of ammonia. Besides this the amount of humus has been largely increased and the water-holding capacity improved; in the case of heavy soils the friability is also improved, thus rendering it easier to work.

On the other hand, the decayed vegetable matter binds sandy soils, and tends to prevent the drifting caused by strong winds. If the cover-crop be heavy it is advisable, before ploughing it under, to cut it up with a disc cultivator, as it is then more evenly distributed, and there is less danger of acid fermentation, with consequent souring of the soil.

For ploughing in the crop, a circular coulter should be used on the plough, and a heavy plough-chain attached to the beam of the plough well in front of the mould-board, and the other end fixed to a cross-piece fastened to the front end of the beam, the chain being adjusted to permit the loop to drag along the ground in front of the mould-board and lay the crop down so that the sod will completely cover it.

Liming.—Although lime is usually present in sufficient quantity to supply the trees' requirement, it is useful in other ways besides being a plant food. As it is an alkaline, it is especially useful when applied to sour soils; it acts on the organic matter, and promotes fermentation, combining with and neutralizing the acids, and assists the nitrifying process, by means of which nitrogen is rendered available to the plant. In addition, it sets free potash which would otherwise be insoluble, and, therefore, of no use. On heavy clay soils, it improves the mechanical condition, making it more friable and amenable to cultivation, while it improves sandy soil by tending to bind it.

Formerly it was customary to give heavy dressings of lime at long intervals, but this is now considered to be a mistake, as it tends to dry up the humus and destroy beneficial bacteria. Half a ton per acre is usually sufficient for an application if slaked lime be used, and from 12 to 15 cwt. if ground limestone or agricultural lime.

For soils known to be sour, freshly slaked lime should be applied at the rate of from 15 cwt. to 1 ton per acre. Sorrel growing on the land is an indication of sourness, as it is an acid-loving plant. A simple test for acidity may be made with blue litmus paper, which may be obtained from any chemist. A strip of the paper, if placed in the soil when moist, will turn pink if the soil be acid or "sour."

Lime should not be mixed with the following manures, viz., superphosphate, bone-dust, animal manures, or sulphate of ammonia, and should not be applied to the soil at the same time as these. When quicklime is to be applied a convenient method is to place it in heaps at convenient distances for spreading with a shovel; a little earth thrown over the heaps will assist in breaking down the lumps into powder; when slaked it can be readily distributed with a shovel. Ground limestone (agricultural lime) and slaked lime, if free from lumps, can be most conveniently spread with a drill, or a lime spreader.

Phosphoric Acid.—Most of the soils in Victoria are deficient in phosphoric acid, which is the chief element in superphosphate and bone-dust, the latter also supplying a small amount of nitrogen. The importance of adding phosphoric acid to the soil is exemplified by the fact that practically every wheat-grower in the State applies superphosphate with the wheat when sowing. Bone-dust is a slow acting manure, and the best time to apply it is in the autumn; it will then become gradually available as a plant food. Superphosphate, on the other hand, is highly soluble, and unless added in conjunction with a green-manure crop, is best applied in the spring, when it is immediately available for

the roots of the trees. For an orchard in full bearing an autumn dressing of 2 cwt. of bone-dust, and a spring dressing of 2 cwt. of superphosphate, would be suitable for average soils, but where very large yields are obtained the amounts may be increased with advantage.

Nitrogen.—This is supplied in artificial fertilizers in the form of sulphate of ammonia, nitrate of soda, nitrate of potash, dried blood, and animal manures. It is an expensive plant food, and probably sulphate of ammonia, which is a by-product from gas works, is the cheapest source of supply. This is a highly soluble manure, and should be applied in the spring at the rate of about 1 cwt. per acre. Dried blood is a slower acting manure containing nitrogen, and may be applied in the autumn; from 2 to 3 cwt. would be a suitable dressing for trees in full bearing. Green manuring with a leguminous crop is, when practicable, the most satisfactory method of obtaining nitrogen.

Potash.—This is contained in the artificial manures, muriate of potash, sulphate of potash, and kainit, and also in wood ashes.

The potash salts were solely supplied by Germany before the war, and are not now obtainable at a price which the grower could afford to pay. One cwt. of muriate or sulphate of potash per acre, or 4 cwt. of kainit, would be a suitable dressing for trees in full bearing. Fortunately the great majority of our soils appear to contain sufficient potash, though it may not always be available without the application of lime, which sets free insoluble compounds and enables the roots to take up the potash.

By the following treatment, therefore, all the essential constituents of a soil may be supplied without having to buy potash or nitrogen. In the autumn apply lime, which will also set free potash; in the following autumn sow a crop of peas or other leguminous cover-crop with superphosphate or super and bone-dust. The peas yield the nitrogen and humus, and the super and bone-dust the phosphoric acid. In addition to this, one or two dressings of superphosphate in the spring should be given, as the phosphoric acid will be immediately available when the trees are in active growth.

In young plantations, if the trees fail to make satisfactory growth in spite of proper attention to cultivation and water, the grower should have his soil analyzed in order to find out if an essential element be lacking. He should then apply the manure which the analysis shows to be wanting. Poor growth is generally due to lack of nitrogen, and half-a-pound of sulphate of ammonia, or 1 lb. of blood manure, for small trees would quickly show results in improved vigour and in a deeper green of the foliage. Distinct lack of colour in the leaf, with yellow showing along the veins, indicates a deficiency of iron in the soil. The condition is known as chlorosis, and is due to want of chlorophyll, as the green-colouring matter is called. It is the chlorophyll in the leaf which enables it to obtain carbonic acid gas from the atmosphere, and by far the greater part of the solid matter in a tree is composed of the carbon thus obtained from the atmosphere.

The condition of chlorosis is due to lack of iron in the soil in an available form, and may be remedied by the addition of sulphate of iron. This should be sprinkled over the ground in the autumn, using from ¼ lb., for small trees, up to 1 lb. per tree, or 1 cwt. per acre, for trees in bearing.

Artificial manures, when used in orchards in full bearing, should be spread over the whole area—not simply spread round the trees—and a drill is the most satisfactory implement to use; the manure should be ploughed in so as to place it as near the roots as possible.

Manuring should be systematic and regular; heavy dressings, at intervals of three or four years, will not give the results obtained by frequent applications in moderate quantities. In districts of heavy rainfall, and where irrigation is practised, a much heavier dressing of artificial fertilizers may be safely given than where the rainfall is moderate and no water is applied. The writer has seen as much as half a ton of superphosphate applied in one season to an acre of large apple trees with beneficial results, but it is probable that some of this would be washed away by heavy rains. Smaller dressings given regularly would probably give better results.

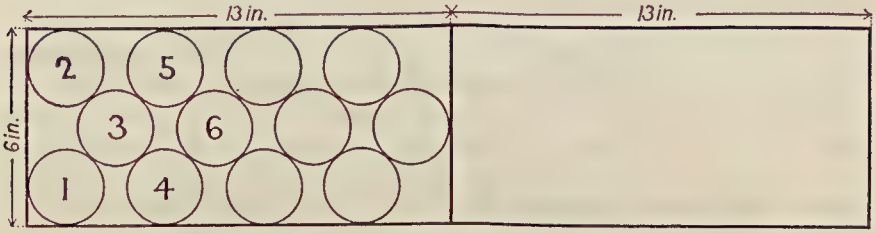


Fig. 34.—The Diagonal Pack.

Marketing.

In picking peaches for marketing, the stage of ripeness must depend on the distance from the market and the time the fruit will be on the journey. If the market be within carting distance from the orchard, the fruit should be left until it has coloured well and comes away readily from the stalk. The grower will soon find from experience the best stage at which to pick, so as to get it to market in the best condition for selling.

For sending to the Melbourne market from the Goulburn Valley districts, peaches must be quite firm, but on pressure with the finger on the apex a very slight "give" should be noticeable, and the fruit should come away from the stalk fairly easily. The part of the skin showing green should show a lighter colour than fruit which is not ready for picking. Fruit picked too soon, though it may be well coloured, will not ripen satisfactorily, and will have a wilted appearance when it reaches the market. If picked too late, it will arrive in a bruised and wasty state.

Dessert peaches should be picked into baskets or buckets, preferably padded, to avoid bruising, and carted as soon as possible to a cool packing-shed. The largest should be placed in peach trays, resembling an ordinary long bushel case halved lengthwise, and with space for one layer of peaches. For sending by rail, the peaches should be placed as close as possible without bruising, and three trays cleated together, the top one having a lid nailed on.

Peaches under $2\frac{1}{2}$ inches in diameter are usually packed in half-bushel cases, the very small ones being kept out and packed in the bushel cases. Fig. 34 represents the bottom of a half-bushel or bushel

case, showing how the first layer of peaches should be placed. This is called the diagonal pack. When packing the next layer, the first peach should be placed in the space between 1 and 2, the next between 1 and 4, and the next between 2 and 5, and so on. The third layer should again be packed in the spaces, so that the first and second will be immediately over 1 and 2 in the bottom layer. By this method the fruit packs closer than if each peach were placed immediately over the one below, and carries with less danger of bruising. When packing

Fig. 35.—A Grading Machine.

firm fruit for carriage by rail, the top layer should be a little above the level of the top of the case, about ½ an inch for half-cases and an inch or slightly more for whole cases. Before nailing on the lid, a padded board should be held at both ends on the top of the case, and the case dumped gently on the floor, first one end and then the other. The lid may then be easily nailed on, and the case is ready for labelling or branding with the grower's name or brand and that of the consignee. This should be placed on one end of the case, and not on the lid or side.

Artificial manures, when used in orchards in full bearing, should be spread over the whole area—not simply spread round the trees—and a drill is the most satisfactory implement to use; the manure should be ploughed in so as to place it as near the roots as possible.

Manuring should be systematic and regular; heavy dressings, at intervals of three or four years, will not give the results obtained by frequent applications in moderate quantities. In districts of heavy rainfall, and where irrigation is practised, a much heavier dressing of artificial fertilizers may be safely given than where the rainfall is moderate and no water is applied. The writer has seen as much as half a ton of superphosphate applied in one season to an acre of large apple trees with beneficial results, but it is probable that some of this would be washed away by heavy rains. Smaller dressings given regularly would probably give better results.

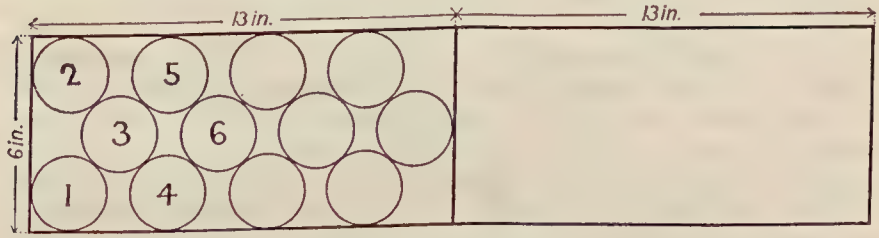


Fig. 34.—The Diagonal Pack.

Marketing.

In picking peaches for marketing, the stage of ripeness must depend on the distance from the market and the time the fruit will be on the journey. If the market be within carting distance from the orchard, the fruit should be left until it has coloured well and comes away readily from the stalk. The grower will soon find from experience the best stage at which to pick, so as to get it to market in the best condition for selling.

For sending to the Melbourne market from the Goulburn Valley districts, peaches must be quite firm, but on pressure with the finger on the apex a very slight "give" should be noticeable, and the fruit should come away from the stalk fairly easily. The part of the skin showing green should show a lighter colour than fruit which is not ready for picking. Fruit picked too soon, though it may be well coloured, will not ripen satisfactorily, and will have a wilted appearance when it reaches the market. If picked too late, it will arrive in a bruised and wasty state.

Dessert peaches should be picked into baskets or buckets, preferably padded, to avoid bruising, and carted as soon as possible to a cool packing-shed. The largest should be placed in peach trays, resembling an ordinary long bushel case halved lengthwise, and with space for one layer of peaches. For sending by rail, the peaches should be placed as close as possible without bruising, and three trays cleated together, the top one having a lid nailed on.

Peaches under 2½ inches in diameter are usually packed in half-bushel cases, the very small ones being kept out and packed in the bushel cases. Fig. 34 represents the bottom of a half-bushel or bushel

case, showing how the first layer of peaches should be placed. This is called the diagonal pack. When packing the next layer, the first peach should be placed in the space between 1 and 2, the next between 1 and 4, and the next between 2 and 5, and so on. The third layer should again be packed in the spaces, so that the first and second will be immediately over 1 and 2 in the bottom layer. By this method the fruit packs closer than if each peach were placed immediately over the one below, and carries with less danger of bruising. When packing

Fig. 35.—A Grading Machine.

firm fruit for carriage by rail, the top layer should be a little above the level of the top of the case, about ½ an inch for half-cases and an inch or slightly more for whole cases. Before nailing on the lid, a padded board should be held at both ends on the top of the case, and the case dumped gently on the floor, first one end and then the other. The lid may then be easily nailed on, and the case is ready for labelling or branding with the grower's name or brand and that of the consignee. This should be placed on one end of the case, and not on the lid or side.

Growers with large areas under dessert peaches usually pack only in the bushel case, and the small fruit is not packed, but merely run into the cases and dumped to settle the fruit firmly; but a grower with a limited quantity should endeavour to get the best possible price for his choice fruit by careful packing in trays and half-cases.

Besides the trays already mentioned, crates containing trays are obtainable. These are very suitable for choice fruit. The trays are filled and placed in the crate, which is returned to the grower by the consignee after removing the fruit.

Peaches intended for marketing should be graded by hand, but Clingstone varieties for factory use may be graded by means of a machine. Fig. 35 is a photograph of a grading machine which is in use in many of the large orchards. It is called the "Velvet" grader, and makes five grades. The fruit is fed into the hopper, and is

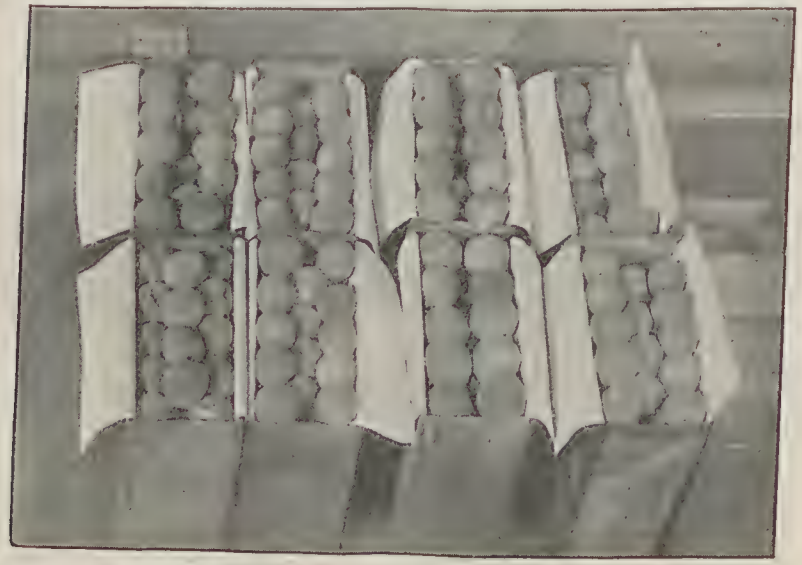


Fig. 36.—Peaches packed in Bushel Cases.

carried along between two battens placed close together next the hopper and further apart at the far end, by means of two ¼-in. belts running just under the jaws of the battens. As each peach reaches a wide-enough place between the battens it falls through on to a piece of canvas beneath, divided into four spaces by boards; the fruit then rolls into the cases placed to receive the different grades. This grader will not bruise firm fruit; it may be worked either by hand or power.

Fig. 36 is a photograph of peaches packed in bushel cases before being dumped and lidded.

Clingstone peaches being much firmer than dessert varieties require less care in handling, but bruising and the picking of immature fruit must be avoided. Picking bags strapped over the shoulders, leaving both arms free, are in general use for this work. When the bag is filled, a flap in front is unhooked, and the fruit is then gently slid on to the packing bin or into boxes. Fruit marked by hail or disfigured

by the Rutherglen bug is not now accepted by the factories, and this must be sorted out when packing.

Fig. 37 is a photograph of a suitable ladder for picking fruit on high trees and pruning. As only three points rests on the ground, it will stand firm on an uneven surface. Ladders with four legs are unsteady and dangerous.

Fig. 37.—A handy Ladder for use when fruit picking or pruning.

BORERS IN SUGAR GUMS.

A Mallee farmer writes that one of the trees in his sugar gum avenue is being attacked by a grub. The bark has gone black, and if the ground around the tree is allowed to settle it assumes a greasy appearance.

The Government Entomologist says that the cause of the trouble is probably the larvæ of the longicorn beetles (borers), and he recommends the following treatment:—

If the insects are in the tree their tunnel will be noticed. Dip a piece of rag or wadding into bisulphide of carbon, plug this into the tunnel, and cover over immediately with clay to prevent the fumes from escaping. Remove all loose bark, as grubs often tunnel behind it into the stem of the tree.

TOBACCO FOR VICTORIANS.

SEED BEDS FOR BRIGHT TOBACCO.

By Max Valentine, Field Officer.

The most difficult process in connexion with the growing of tobacco is the raising of a supply of young plants, and any extra care and attention given to this work will be amply rewarded once tobacco is firmly established in the field; it is a hardy plant, which will survive many other crops during an adverse season.

Selection of Seed.

The selection of the seed is the first consideration. Having decided what variety is required for the particular area to be cropped, the prospective grower should be careful to purchase supplies only from reliable sources. The cost of the seed is so small—only from 2s. 6d. to 5s. per oz.—that quality, not quantity, should be sought. An ounce will, in normal conditions, provide sufficient plants for about eight acres of bright tobacco, reckoning, approximately, 5,000 plants to the acre.

Selection of Site.

The next essential point to be observed is the choice of suitable locations for seed beds.

As it is impossible to foretell what weather conditions will prevail during the germinating period, it is necessary to prepare for all contingencies. Therefore, it is desirable to have several small seed beds in different parts of the plantation, rather than to depend on one large bed. During a hot, dry spell, a bed situated in a protected hollow where there is plenty of moisture, and near running water (not stagnant water), which will make watering less burdensome, will probably prove the best. If the season be a wet one, then a spot located high on a hill-side, with a northerly aspect, will give better results. In any case, as the first seed beds are sown in the late winter or early spring, they should be placed where they will be sheltered from the cold winds and also where they will receive the maximum amount of sunlight, especially the sunlight of early morning.

It is a universal custom to prepare the seed beds on freshly cleared land, when possible, the reasons being that such land contains an abundance of humus, is less likely to bake by the sun and heavy rains, and will probably be comparatively free from weeds and insect pests. If such a spot can be found near the homestead, so that the beds can be constantly under the grower's supervision, so much the better.

Soil.

The most suitable soil for tobacco seed beds is a deep, friable, light sandy loam of good fertility. Such soil is naturally well drained, which is highly important, and at the same time conserves sufficient moisture for the tender young plants. Black turf soil is too heavy

for seed beds, as the plants are very slow in the early stages of growth. From the time the seed germinates until the tobacco is harvested, a quick and uninterrupted growth is necessary, if the cured leaf is to possess good texture and aromatic qualities. Cold clay soils are liable to hold too much moisture; germination, consequently, will be slow, and the beds will crack and bake hard when drying, thus making it difficult to draw the young plants at transplanting time.

As the area of the seed beds is very small, the difficulty of dealing with heavy soils can easily be overcome by spreading a few waggon loads of sand on the surface, thoroughly mixing the whole by several times forking the land.

The Preparation of Seed Beds.

Having selected the site for the seed bed, the first step is to kill all weed seeds, fungi, and soil insects which may be in the ground. This is usually done by one of two methods, *i.e.*, burning or steam sterilizing.

1.—Burning.

Burning is the practice more commonly followed where a good supply of fuel is easily obtainable. The procedure is as follows:—

First rake from the bed all grass leaves and any other litter which might hold moisture and tend to prevent heat from penetrating the soil. Then place long poles 3 or 4 inches in diameter across the land at intervals of about 4 feet; upon these pile brush, straw, wood, &c., to a height of 4 or 5 feet. If this heap be lit on the leeward side, a slow fire will result. To be effective, the fire must thoroughly heat the soil, drying it out to a depth of 3 inches. After raking off the coarse ashes, the soil must be worked finely to a depth of 3 or 4 inches with a spade or hoe. In many cases it will pay to mix in at this stage about two pounds of bonedust and blood manure to every 10 square yards (the fine ashes resulting from the fire will supply the necessary potash), while a light application of superphosphate will be an improvement. Farm-yard manure is not generally used, as it is likely to introduce weeds. Work up a fine surface tilth with a rake, and keep the bed as level as possible, in order to guard against subsequent rains washing away the seed.

2.—Steam Sterilization of Seed Beds.

The following method of sterilizing seed beds has been compiled from a bulletin issued by the United States Department of Agriculture:—

The direct application of steam to the soil by means of an inverted pan or hood has now been proved to be a highly satisfactory way of sterilizing plant beds.

The seed bed is thoroughly prepared in the usual manner for sowing the seed. The soil is well worked, the fertilizers (if any) spread and mixed in the soil, and the bed brought to a fine tilth, so that after the steaming is completed it is only necessary to rake the bed lightly before sowing the seed. It is important that nothing but the seed and the diluting material, also sterilized if necessary, should be added to the bed after the sterilization.

A comparatively dry bed is the first requisite for successful steaming, as it is practically impossible for the steam to penetrate wet soil. Also the presence of frost in the surface soil retards the penetration of the steam, and makes it necessary to continue the process for a much longer period.

The equipment needed for the operation is—

A portable boiler
Heavy ¾-inch steam hose of, say, 25 feet length
Heavy canvas or bagging to cover bed after steaming
Steaming pan of wood or galvanized iron
Attachments for connecting piping to boiler and pan.

Experience has shown that a boiler of at least 20 horse power is necessary for a pan 72 square feet in area. A larger pan than this is difficult to move about. Where a smaller boiler is used, the pan must be correspondingly smaller, so that the boiler can maintain the desired pressure of 80 to 100 lbs. Pans can be made of either galvanized iron or wood, the latter, perhaps, being the cheaper and also having the advantage of losing less heat through radiation.

The pan is simply a shallow box, 4 inches deep, the frame being made of 2 x 4 inch material. Across the frame are laid matched boards, ⅝ x 4 inches. The whole must be securely fitted, as the wood will swell by absorbing moisture during the steaming, and it is advisable to put white lead in the grooves to prevent leakage. Handles should be placed at each corner to facilitate handling. An added improvement is a strip of felt packing ¼ inch thick by 2 inches wide, placed along the lower edge of the frame, on the outside, to prevent the escape of steam. In the middle of one end of the frame is set a ¾-inch nipple, 6 or 7 inches in length, through which the steam is delivered into the pan. The nipple should extend about 3 inches from the box to afford a convenient attachment for the hose, and should be held in place by lock-nuts closing on leather gaskets.

The iron pan is similar in shape and size to the wooden one, and has the advantage of being lighter. It is made of 16 or 18 gauge galvanized iron, supported by iron ribs of 1½-inch angle bars.

The Steaming Process.—The pan is placed on the bed, open side down, and soil is banked around the edges to prevent the escape of the steam. The hose is attached to the pan and to the pipe leading from the boiler. It is desirable to maintain a pressure in the boiler of 100 lbs., with a minimum of 70 lbs. Steam of high pressure has much greater penetrating power than steam of low pressure, and it is important to realize that the efficiency of the operation is greatly increased by dry high-pressure steam. After 30 minutes the steam is shut off and the pan moved along the bed to the next area. One end of the pan should slightly overlap the area just steamed, thus leaving no area unsterilized. Immediately after moving the pan the steamed strip should be covered with a canvas or bagging. It is desirable that covers be provided for the entire bed, so that each area will be covered for several hours after steaming.

In light soils, after 30 minutes' steaming, the temperatures to be expected in the upper 2 inches of soil directly under the pan are,

approximately, 208 to 212 degrees F., at 3 to 4 inches, 170 to 180 degrees, and at 6 inches, 120 degrees. If a thermometer is not available, the efficiency of the steaming operation can be easily determined by burying a potato 4 inches under the soil. The potato should be well cooked when the pan is removed. This is a common method of determining the work done by the steaming outfit.

Clay soils, because of their heavier texture, require longer periods for steaming than sandy soils.

In considering the cost of the operating, one should bear in mind the fact that a thoroughly steamed bed is practically free from weed seeds, thereby eliminating the cost of weeding. Additional advantages are that the plants are more vigorous and are ready for transplanting ten to fourteen days earlier than plants in unsterilized beds.

The seed may be safely sown twelve hours after the steaming of the beds.

It will be found that steamed seed beds may require more water to raise a crop of seedlings than an untreated bed, but care must be taken not to overwater.

Care of the Seed Bed.

Seed beds should be laid out so as to be easily accessible, and should not be more than 5 feet in width, thus facilitating weeding and artificial watering. Where the rainfall is heavy, it is advisable to raise the beds about 6 inches above the surrounding land, but where the drainage is good level beds give best results.

When sowing the seed, care must be taken to spread it evenly over the bed, and not too heavily. If too much seed be sown, the plants will become congested, and, as a result, will be spindling and weak. Only strong vigorous plants will thrive when transplanted. Where pure seed is used, a heaping tablespoonful is enough to sow 100 square yards of bed. This quantity should be thoroughly mixed with about a bucketful of fine dry ashes, sand, gypsum, or bonemeal, and scattered backwards and forwards over the bed. Tobacco seed is so fine that if it be buried deeply, it will not germinate. Therefore, do not attempt to rake it in, but simply sprinkle lightly with water if the ground be dry, and press down with a board or the back of a spade.

The whole bed should now be enclosed in a wooden frame 6 inches high. This frame may be improvised from logs or planks, and covered over with plant-bed cloth. The material for this cloth should be either light-weight hessian or cheese cloth. It should be free from holes, which might allow the entrance of flies and other insect enemies. A good idea is to stretch wires at regular intervals across the framework so as to keep the cloth from sagging in the centre.

While the seed is germinating and the plants growing, the soil must be kept warm and moist and free from weeds. If the plants come up too thickly they should be thinned out, so as to allow each one about a square inch of space. About ten days or a week before transplanting the bed-cloth should be gradually removed, so that the plants will harden sufficiently to withstand removal.

In addition to having a number of beds in different positions, as here recommended, it is strongly advisable to sow both early and late

beds. The time for seeding will depend on local climatic conditions, but it should be remembered that tobacco seed will not germinate until the ground is warm. Sowing before the winter is over is inadvisable, as resulting plants, if they thrive at all, will be far more susceptible to diseases than later ones, and will need much more attention.. In most parts of Victoria, beds can be sown at intervals of about two weeks from August, up till late November. This ensures a supply of plants in the event of either an early or a late season.

A bed with an area of 100 square yards will probably yield as many as 40,000 plants, but it should be depended on for only 10,000 or 15,000 first-class plants. A good rule to follow is to sow 50 per cent. more beds than is really needed for the acreage proposed to be cropped. It is so essential to the success of the season's labours to be assured of an ample supply of healthy young plants at the right time, that any extra work and care devoted to this operation is justified.

[The next article on this subject will deal with the preparation of the soil for transplanting, and the cultivation of bright tobacco.]

ELIMINATING BAD SIRES.

To sum up the steps required in the elimination of the scrub sire, the following rules will help:—

1. Select the breeds and classes of animals most suited to the soil and climate.
2. Farm the land so that it produces the best feed.
3. Keep the stock sound and healthy all the year round.
4. At the beginning lay down a definite type and mercilessly cull any marked deviation from it.
5. Study pedigree and never breed from a chance animal however attractive it may be.
6. Never breed from an unsound or degenerate weed.
7. Insist on size, energy, massive development, and virility in the male, fine quality and motherliness in the female.
8. Pay equal attention to selection of both dam and sire.
9. Watch prepotency on both sides; stick to those that breed true.
10. Start breeding with young vigorous animals, male and female.
11. Pension off old worn-out animals.
12. Keep clear of females that are old before being brought into the stud.
13. Mate so as to correct weak points of one by strong points of the other.
14. Avoid mating animals of widely different types.
15. Study type. Breed to type. Stick to type.

Journal of Agriculture of South Australia, November 1921.

STANDARD HERD TEST.

REPORT FOR QUARTER ENDED 30th SEPTEMBER, 1921.

The number of cows which completed the test during the quarter is 322, of which 249 yielded the quantity of butter fat requisite for a certificate. Individual returns are as follows:—

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.
								lbs.	lbs.		lbs.	lbs.	lbs.
W. K. Atkinson, Swan Hill	6	6	Shorthorn ..	Roan Daisy 18th	10900	28.9.20	273	18½	8,749	3·94	344·75	250	393
				Blanche Rose 9th	10891	30.9.20	273	12½	10,323	3·74	387·08	250	441½
				Cherry of Willow Park	9198	11.10.20	273	28½	8,733	3·72	324·67	175	370½
				Blanche Rose 10th	10892	13.10.20	273	31½	11,052	3·66	404·69	250	461½
				Cherry 5th	10893	4.11.20	273	21	8,595	3·99	343·13	250	391¼
				Duchess of Willow Park	9429	7.11.20	273	27	9,129	3·70	337·52	200	385
Mrs. I. Beard, Outtrim	1	1	Jersey ..	Nanette 2nd	6142	27.10.20	273	8½	5,605	6·55	367·29	250	418¾
F. W. Beischer, Bendigo	3	3	Jersey ..	Daisy 3rd of Kingsvale	Not yet allotted	7.10.20	273	10½	6,749	4·39	296·19	250	337½
				Annette 2nd of Kingsvale	..	20.12.20	273	15	6,411	4·76	304·96	250	347½
				Tulip of Meridale	7515	24.12.20	270	15	4,905	5·68	278·65	250	317½
J. Benallack, Elliminyt	5	3	Ayrshire ..	Baronia of Woodbyrne	4893	27.10.20	273	12½	6,245	4·23	263·91	175	300¾
				Pert Lass of Woodbyrne	4895	3.11.20	273	8½	5,555	3·94	219·86	175	250¾
				Promise of Woodbyrne	4896	7.11.20	273	14½	5,241	4·04	211·90	175	241½
F. Bidgood, Staghorn	2	1	Jersey ..	Milkmaid of Staghorn	Not yet allotted	31.10.20	270	11	4,089	5·60	229·01	175	261
Mrs. Agnes Black, Noorat	2	2	Jersey ..	Noorat Sheila	6414	30.9.20	273	10½	4,196	5·27	221·38	200	252½
				Noorat Grey Girl	6412	4.10.20	273	9	5,865	5·00	292·18	200	333
Callery Brothers, Bannockburn	4	2	Ayrshire ..	Moel of Langley Park	6182	26.9.20	270	4	4,528	4.31	195·43	175	222¾
				Bonnie Jean of Langley Park	3478	16.11.20	273	9½	6,263	4.70	294·13	250	335½

CERTIFICATED COWS—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.
								lbs.	lbs.		lbs.	lbs.	lbs.
R. C. Campbell, Clarendon	1	1	Jersey ..	Heroine 4th	Not yet allotted	30.10.20	273	13½	6,135	5·13	315·32	200	359½
H. D. W. Canobio, Tatura	3	3	Ayrshire ..	Annette of View Point	4959	6.10.20	273	14	7,966	3·96	315·52	200	359½
				Mode of Fernhill	4701	1.11.20	273	18	8,507	4·10	349·19	250	399
				Adelia of Woodstock Grange	9458	21.11.20	273	14½	5,883	4·16	244·88	175	279½
Mrs. M. E. Carroll, Tyntynder Central	3	3	Red Poll ..	Cambria	430C	25.9.20	273	4½	6,900	4·17	287·46	200	327½
				Jamaica	208A	9.10.20	273	15	8,052	4·00	322·02	250	367½
				Scotia	525D	22.10.20	273	16½	9,996	3·79	378·92	250	432
J. W. Cochrane, Moorabbin	4	3	Ayrshire ..	Roseleaf of View Point	4975	26.9.20	273	15	8,353	4·18	349·21	250	398
				Ruby of Springfield	6243	8.10.20	273	7	5,895	4·12	242·89	175	277
				Cowslip of Devon Park	7863	20.12.20	273	12	6,101	4·83	294·89	250	336½
W. J. Colman, Kerang	5	4	Jersey ..	Wattle Blossom of Roseneath	6097	28.9.20	255	4	5,182	4·99	258·44	250	294½
				Laurie 2nd of Roseneath	6095	18.11.20	202	4	5,183	5·14	267·60	250	305
				Starleigh's Princess of Clover Flat ..	6096	6.12.20	273	20	7,004	5·45	381·65	200	438
				Princess of Kudala	5314	17.10.20	241	4	5,943	4·78	284·06	250	323¾
O. Cutler, Longwarry South	1	1	Jersey ..	Bright Stockings of Warenda	7189	27.11.20	259	4	4,470	5·32	237·74	175	271
Department of Agriculture, Werribee	6	6	Friesian ..	Belle Corona	Not yet allotted	29.9.20	273	25½	11,450	3·49	399·98	250	456
				Woodnymph	„	15.10.20	236	27½	10,518	3·07	322·86	250	368
				Narcissus	„	31.10.20	273	19	6,751	3·70	249·60	175	284½
				Dominion Lulu 2nd	376	11.11.20	273	34½	12,847	3·15	404·08	250	460¾
				Dominion Proud Lassie	368	14.12.20	273	30	10,531	3·17	334·22	250	381
				Victoria Dutch Belle	Not yet allotted	18.12.20	273	24½	6,956	3·72	258·74	175	295
„ „	5	5	Red Poll ..	Ontario	399C	9.10.20	269	4	8,391	3·75	315·39	250	359½
				Victoria Red Rose	3AA	12.11.20	248	4	6,354	4·46	283·66	250	323½
				Tonga	253A	19.11.20	273	19½	10,066	4·06	408·44	250	465½
				Netherlana	492D	17.12.20	273	14½	7,363	3·89	286·10	250	326¼
				Birdseye	377C	23.12.20	273	19½	9,028	5·08	458·62	250	522¾

CERTIFICATED COWS—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.
								lbs.	lbs.		lbs.	lbs.	lbs.
Dickinson Brothers, Sebastopol	2	2	Friesian ..	Queenie of Ashby	267	20.10.20	273	20½	10,966	4·01	440·29	200	502
				Countess 2nd of Ashby	328	25.10.20	273	13	5,644	3·84	216·83	175	247½
T. Douglas, Ballarat	2	2	Ayrshire ..	Greatness of Roxburgh	5125	23.10.20	215	4	6,960	4·31	299·63	250	341½
				Lady of Lake Valley	7270	23.11.20	273	11½	7,302	4·28	312·74	250	356½
C. Falkenberg, Elliminyt	2	1	Jersey ..	Princess of Colac	4912	16.10.20	273	15	6,430	5·58	358·11	250	408¾
Finn Brothers, Port Fairy	4	3	Jersey ..	Valda's Queen of Somerville	5948	30.9.20	273	32	9,277	5·01	464·41	200	529½
				Silvermine 15th of Banyule	5221	11.10.20	273	31	8,754	4·64	406·30	250	463½
				Bridesmaid of Clarendoneyre	5271	16.12.20	263	19	6,751	4·60	310·68	250	354¼
Flack and Sewell, Berwick	12	8	Friesian ..	Walulu Abbe Kirk Artis of Corfield ..	Not yet allotted	30.9.20	273	14½	5,728	3·28	188·14	175	214½
				Countess Lulu of Corfield	,,	14.10.20	273	5½	7,422	3·95	293·10	175	334½
				Dominion Queen Segis	,,	14.10.20	273	15	7,916	3·22	264·46	250	301½
				Dominion Flower 2nd	258	20.10.20	212	4	7,684	3·52	270·42	250	308½
				Dominion Cora	261	22.10.20	261	4	8,833	3·45	304·51	250	347¼
				Dominion Homestead Maggie	259	31.10.20	270	4	11,442	3·25	373·25	250	425½
				Monavale Catriona Paxton	Not yet allotted	11.11.20	273	26	9,027	3.83	356·00	175	406
				Holland Lass 2nd of Berry	244	4.12.20	273	16	11,516	3·64	418·97	250	477¾
Mrs. M. and W. A. Francis, Kilcunda	2	2	Ayrshire ..	Olive Berry of Glenbrae	5912	7.11.20	262	4	4,323	4·26	184·03	175	209¾
				Elena of Springfield	4967	15.12.20	263	4	5,043	4·22	212·67	200	242½
M. Galbraith, Tyers	2	1	Ayrshire ..	Dahlia of Retreat	4324	26.9.20	273	11½	5,705	4·43	253·11	250	288½
G. Gange, Mininera	2	2	Ayrshire ..	Eva 2nd of Glencairn	7298	11.11.20	273	16	6,652	4.21	279·89	175	319¼
				Ada of Roseleigh	7295	,,	270	4	5,348	4·29	229·47	175	261¼

CERTIFICATED COWS—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.
								lbs.	lbs.		lbs.	lbs.	lbs.
Kerr Brothers, Bacchus Marsh	7	7	Shorthorn ..	Morven Duchess 15th	Not yet allotted	28.9.20	273	11½	9,337	3·75	349·68	250	398¾
				Morven Duchess 19th	,,	1.11.20	273	11	4,605	3·83	176·26	175	201
				Morven Queenie 10th	,,	9.11.20	273	13	7,744	3·51	272·13	250	310½
				Morven Duchess 17th	,,	10.11.20	273	14	6,168	3·97	244·65	200	279
				Morven Lizzie 9th	,,	17.11.20	273	6½	4,781	4·25	203·36	200	231¾
				Morven Duchess 16th	,,	18.11.20	273	6½	5,710	3·96	226·15	200	257¼
				Morven Duchess of Brunswick 2nd ..	,,	13.12.20	273	12½	4,703	3·80	178·73	175	203¾
G. Keys, Hallam ..	5	4	Ayrshire ..	Velvet of Wethersdane	6484	22.10.20	273	14½	6,038	4·59	277·30	175	316½
				Gay Belle of Wethersdane	Not yet allotted	24.10.20	273	17½	6,449	4·28	276·29	175	315
				Mighty Atom of Wethersdane	,,	9.11.20	273	16½	5,689	4·94	282·35	175	322
				Norah 7th of Avondale	3232	4.12.20	273	20½	6,975	4·29	299·43	250	341¼
A. Kirby, Daylesford	2	2	Ayrshire ..	Melody of Fernhill	5940	20.10.20	273	15½	5,849	3·85	225·47	200	257
				Ada of Wattle Bank	5311	11.12.20	273	17	5,674	4·23	239·94	200	273½
J. A. Lang, Warrion	13	5	Ayrshire ..	Charm of Golden Vein	5418	7.10.20	273	4½	6,058	4·21	254·94	200	290¾
				Emily of Riccarton	6498	14.10.20	272	19½	6,671	4·33	288·60	200	329
				Amy of Golden Vein	2971	18.11.20	273	4½	7,076	4·13	292·43	250	333½
				Gem of Roxburgh	5120	30.11.20	273	9½	6,020	4·18	251·74	250	287
				Tabitha 2nd of Riccarton	6518	6.12.20	273	13	5,493	4·09	224·68	175	256¼
Mrs. E. M. Lennie, Tongala	3	3	Jersey ..	Tulip 4th of Bonshaw	7103	24.10.20	273	17	6,357	5·10	323·96	250	369¼
				Pearl of Hillcrest	6013	26.10.20	273	15	7,360	4·69	345·05	250	393½
				Buttercup 3rd of Bonshaw	7099	5.11.20	273	8½	3,850	5·49	211·22	200	240¾
Leslie and Gerrand, Sale	1	1	Ayrshire ..	Countess of Raith	6521	13.10.20	273	13½	4,969	3·96	196·99	175	224½
R. Lidgett, Myrniong	2	2	Shorthorn ..	Pentland's Bloom	Not yet allotted	24.10.20	273	12½	6,485	4·14	268·37	250	306
				Pentland's Bloom 3rd	,,	27.10.20	270	4	5,264	4·02	211·93	175	241½

CERTIFICATED COWS—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.
								lbs.	lbs.		lbs.	lbs.	lbs.
C. D. Lloyd, Caulfield	4	4	Jersey ..	Golden Fern of Glen Iris	6058	8.10.20	273	14	6,343	6·20	398·89	250	454¾
				Gingerbread	5197	23.10.20	273	12½	6,922	5·55	383·83	250	437½
				Ryebread of Glen Iris	6059	2.11.20	273	9½	5,473	5·35	292·59	250	333½
				Rye Cake of Glen Iris	7111	12.12.20	273	8½	3,673	6·23	228·78	175	260¾
Mrs. H. Luxton, Kew	1	1	Jersey ..	Lotina's Lady	4286	23.11.20	273	13	5,949	4·42	262·78	250	299½
C. G. Lyon and R. R. Kerr	12	12	Jersey ..	Milkmaid 37th	1222	9.10.20	273	4½	7,771	5·17	401·86	250	458
				Molly 6th of Banyule	7124	13.10.20	273	23	8,035	4·51	362·34	175	413
				Chromate of Banyule	7114	14.10.20	273	15½	5,836	5·09	296·93	175	338½
				Pearl 5th of Holmewood	6492	„	273	16	7,452	4·63	344·93	250	393¼
				Thora 7th of Banyule	7133	21.10.20	273	18½	5,748	5·42	311·47	175	355
				Hawthorn 6th of Banyule	5209	24.10.20	273	33	8,018	5·13	411·35	250	470
				Lotus of Banyule	7121	26.10.20	273	17	5,680	5·12	290·76	175	331½
				Lorikeet of Banyule	7120	2.11.20	273	17	6,238	4·38	267·16	175	304½
				Silvermine 18th of Banyule	6080	6.12.20	273	24	8,435	5·12	431·85	200	492¼
				Molly 4th ofBanyule	4246	11.12.20	273	22½	8,176	4·94	403·62	250	460½
				Harp	5206	14.12.20	273	20½	7,382	5·21	384·56	250	438½
				Pearl 3rd of Holmwood	5151	17.12.20	273	18	6,292	5·09	320·06	250	364¾
L. McFarlane, Bundoora	8	6	Ayrshire ..	Mulberry of Ayrbrae	5405	26.9.20	257	4	6,380	4·05	258·39	200	294½
				Daphne of Ayrbrae	5403	30.9.20	273	8½	6,915	4·68	323·93	250	369½
				Beryl of Gleneira	2441	12.10.20	251	4	8,905	3·98	355·08	250	404¾
				Mulberry 2nd of Gleneira	3443	22.10.20	273	16½	7,611	3·82	290·85	250	331¼
				Little Virtue of Ellerslie	6649	6.11.20	273	8	6,325	4·64	293·64	200	334¾
				Peeress of Ayrbrae	5406	24.12.20	263	4	4,814	4·40	211·89	200	241½
F. McIver, Tarwin Lower	2	2	Ayrshire ..	Lady Jar 4th of Gleneira	7569	20.10.20	273	4½	5,038	4·00	201·18	175	229½
				Stella of Glen Alvie	7571	4.11.20	264	4	4,738	4·49	212·77	175	242½
W. J. McKernan, Tatura	2	2	Ayrshire ..	Duchess of Locheden	5437	6.10.20	273	14	5,159	4·09	210·77	175	240¼
				Dot of Golden Vein	2634	21.10.20	273	20	8,325	4·85	404·17	250	460¾

CERTIFICATED COWS—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.
								lbs.	lbs.		lbs.	lbs.	lbs.
P. J. Moloney, Tongala	2	2	Jersey ..	Beauty of Bonshaw	7168	18.12.20	273	11	6,317	5·64	356·51	200	406½
				Our Choice of Tarnpirr	6034	22.12.20	273	23	7,259	6·37	462·31	250	527
W. Meredith, Ondit	2	1	Ayrshire ..	Affinity of Oakbank	5357	24.12.20	270	4	5,236	4·09	214·13	200	244½
T. Mesley, Dalyston	5	5	Jersey ..	Agnes of Warenda	7186	1.10.20	273	24	8,307	6·35	527·20	175	601
				Little Queen	5249	11.10.20	273	21	8,492	5·08	432·02	250	492½
				Little Queen 2nd of Warenda	7192	8.11.20	273	20½	6,584	5.61	369·66	175	421½
				Phyllis 2nd of Warenda	7195	16.11.20	273	13½	5,788	5·36	310·45	175	354
				La Charme	5248	20.12.20	273	20½	8,823	5·45	480·52	250	547½
W. J. Muhlebach, Batesford	4	4	Ayrshire ..	Pretty of Retreat	4338	1.10.20	273	7½	7,120	4·30	306·28	200	349½
				Verbena of Retreat	4341	17.10.20	273	4½	5,013	4·91	246·44	200	281
				Modesty 2nd of Retreat	5390	22.10.20	273	8	6,204	4·78	296·60	175	338½
				Beautiful of Retreat	5381	1.11.20	239	16½	7,145	4·54	324·49	175	370
T. H. Payne, Kilmore	3	3	Red Poll ..	Daffodil	483C	26.9.20	273	15½	7,342	4·86	356·66	250	406¾
				Chance	217AA	3.10.20	273	7	5,772	4·05	233·75	200	266½
				Gratis	218AA	27.11.20	273	14½	7,994	4·06	324·76	250	370½
H. Perdriau, Werribee	2	2	Ayrshire ..	Blanche of Glen Alvie	Not yet allotted	5.12.20	273	16½	5,335	3·62	194·43	175	221¾
				Centague of Banyule	5766	18.12.20	273	11½	5,979	4·56	262·45	250	299
P. Phillips, Murraydale	1	1	Jersey ..	Jessie 11th of Ferntree Vale	Not yet allotted	10.12.20	273	28	7,290	4·05	295·57	175	337

CERTIFICATED COWS—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.
								lbs.	lbs.		lbs.	lbs.	lbs.
J. Platfuss, Tongala	1	1	Friesian ..	Monovale Juno Paxton	169	10.11.20	273	26	9,766	3·34	325·97	175	371¾
T. Raggatt, Casterton	2	1	Jersey ..	Queen's Princess of Clover Flat	7447	26.10.20	273	18	5,458	4·63	252·50	175	288
R. Ralston, Moglonemby	2	2	Ayrshire ..	Ibis of Gleneira	3430	13.10.20	273	4½	6,430	4·65	299·04	250	341
				Welcome of Ben Kell	4591	16.10.20	273	13	7,203	3·54	255·06	200	290¾
Miss Bruce Reid, Bundoora	5	1	Jersey ..	Mauve Lilac of Kameruka	7349	27.11.20	273	11	5,105	5·71	291·57	250	332½
C. J. Reid, Devenish	2	1	Jersey ..	Carine of Clarendoneyre	7354	5.10.20	273	6	3,907	5·20	203·27	200	231¾
C. Rigby, Lower Ferntree Gully	1	1	Ayrshire ..	Gwendoline of Gleneira	Not yet allotted	7.10.20	273	7½	7,913	3·80	300·49	250	342½
J. H. Rogers, Yarraville	6	4	Ayrshire ..	Pearl of Riverside	6827	2.10.20	273	9	9,057	3·81	345·59	250	394
				Daisy of Bundara	4258	10.10.20	273	34½	10,612	4·28	454·09	250	517¾
				Bonnie of Glencairn	5640	11.10.20	273	34½	9,030	3·26	295·53	200	337
				Ruby of Riverside	6835	27.11.20	273	13	5,558	3·98	221·30	200	252½
G. Rowe, Kardella	1	Nil	Jersey ..										
F. W. Sadler, Camperdown	7	5	Shorthorn ..	Roan Ada 4th	Not yet allotted	28.9.20	273	11½	8,292	3·65	302·68	250	345
				Holly Queen	„	6.10.20	273	20	7,597	3·85	305·96	250	348¾
				Red Pet	„	17.10.20	273	13	6,926	4·14	286·68	250	326¾
				Diana 6th of Braelands	„	9.11.20	273	17½	8,222	3·96	325·84	250	371½
				Edith 5th of Hillfield	„	15.12.20	258	17	6,121	3·88	237·46	200	270¾

CERTIFICATED COWS—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.
								lbs.	lbs.		lbs.	lbs.	lbs.
Sadler Brothers, Noorat	10	9	Ayrshire ..	Ada of Wethersdane	4152	29.9.20	273	7½	7,668	3·56	273·40	250	311¼
				Laurel of Burnbrae	4615	21.10.20	273	10	8,197	3·86	316·66	250	361
				Lady of Ecclefechan	2308	2.10.20	210	4	7,024	4·14	290·45	250	331
				Satinbird of Burnbrae	4621	3.10.20	273	6½	7,267	4·32	314·08	250	358
				Pearleen of Kilmarnock	7701	10.10.20	273	4	7,675	3·85	295·12	250	336½
				Cinderella of Burnbrae	5836	25.10.20	273	9½	5,211	3·41	177·60	175	202½
				Lenore of Ecclefechan	2692	24.11.20	273	14	8,187	3·99	326·04	250	371¼
				Flirt of Kilmarnock	3091	27.11.20	273	20½	8,701	3·48	303·19	250	345¾
				Fairlie of Burnbrae	4609	10.12.20	273	13½	7,859	4·29	337·51	250	384¼
A. H. Schier, Kernot	24	16	Ayrshire ..	Pearl Queen of Wethersdane	7452	27.9.20	273	9½	6,047	3·99	241·16	175	275
				Mitre of Balvormie	4634	28.9.20	273	8½	5,738	4·51	258·92	250	295¼
				Streak of Balvormie	4644	1.10.20	273	10½	6,866	4·21	288·96	250	329½
				Snowdrop of Inverleigh	5865	1.10.20	270	4	5,179	4·26	220·76	175	251¾
				Boronia 2nd of Pine Grove	4626	3.10.20	273	5	6,294	4·46	281·14	250	320½
				Mabel of Simpson House	5127	10.10.20	270	4	6,259	4·28	267·98	250	305¼
				Silverine of Inverleigh	5864	14.10.20	266	4	5,723	4·62	264·75	200	301¾
				Rita of Inverleigh	5863	16.10.20	273	11½	5,111	3·91	200·07	175	228
				Modesty of Inverleigh	5861	17.10.20	273	11½	4,961	4·49	222·80	175	254
				Myrtle 2nd of Pine Grove	4637	18.10.20	273	10	7,119	4·18	297·71	250	339½
				Primrose 2nd of Pine Grove	4640	30.10.20	273	11	6,603	4·05	267·12	250	304½
				Fine Quality of Gleneira	7711	30.10.20	273	7½	4,025	4·63	186·58	175	212¾
				Milk Kiss of Inverleigh	5858	,,	273	8½	4,903	4·06	199·11	175	227
				Adella's Pet of Inverleigh	5853	1.11.20	273	10	5,702	4·39	250·27	175	285½
				Prudence of Roxburgh	6331	21.11.20	273	16½	5,354	3·48	186·47	175	212½
				Dolly Brown of Inverleigh	5854	27.11.20	273	12½	6,587	3·85	253·37	200	289
J. Scott, Chiltern ..	4	4	Jersey ..	Cora 2nd of Havilah	6064	26.9.20	231	4	6,431	5·61	360·61	250	411
				Forty Winks	Not yet allotted	7.10.20	273	16	6,347	5·14	326·39	175	372
				Silvermine of Elouera	7434	1.11.20	273	7½	2,705	6·66	180·35	175	205½
				Petal's Audrey of Elouera	7433	9.11.20	231*	17	4,713	5·40	254·71	175	290½

* Sold.

CERTIFICATED COWS—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.
								lbs.	lbs.		lbs.	lbs.	lbs.
O. J. Syme, Macedon	6	6	Friesian ..	Bolobek Dot	339	8.10.20	273	17	9,175	3·46	317·42	175	362
				Duplicate Posch Maud	300	9.10.20	221	4	10,886	3·35	364·57	250	415½
				Barbara of Brundee	298	20.10.20	273	16	9,334	3·21	299·31	250	341¼
				Bolobek Aaggie	318	30.10.20	273	29½	12,774	4·22	538·53	250	614
				Bolobek Ruby	314	1.11.20	273	27½	10,403	3·03	315·27	200	359½
				Bolobek Rhoda	309	20.12.20	273	19	10,517	3·61	378·72	250	431¼
J. H. Thorburn, Woodend	1	Nil	Ayrshire ..										
D. G. Tomkins, Coleraine	1	1	Jersey ..	Lassie 7th's Princess of Clover Flat ..	6245	13.11.20	273	27½	8,775	4·76	417·48	200	476
W. M. Vale, Yarram	3	2	Jersey ..	Lily 3rd of Ferntree Vale	Not yet allotted	12.12.20	273	15	4,788	5·16	247·41	175	282
				Lady Patty of Ferndale	,,	17.12.20	273	11	5,078	5·10	259·04	175	295¼
Agricultural High School, Warrnambool	2	Nil	Ayrshire ..										
W. Woodmason ..	11	11	Jersey ..	Peerless 18th of Melrose..	Not yet allotted	26.9.20	273	13	4,641	5·55	257·94	175	294
				Graceful Duchess 11th of Melrose ..	395 C.H.B.	27.9.20	273	21	7,454	6·16	459·54	250	524
				Jessie 15th of Melrose	5546	11.10.20	273	16	5,725	6·21	355·74	250	405½
				Chevy 8th of Melrose	4511	12.10.20	273	22	7,075	5·84	413·70	250	471¼
				Graceful Duchess 20th of Melrose ..	Not yet allotted	,,	273	10	4,045	6·16	249·05	175	284
				Purity 5th of Melrose	7548	8.11.20	273	7	2,982	5·93	176·98	175	201¾
				Peerless 20th of Melrose	Not yet allotted	13.11.20	273	18	6,348	5·40	343·08	200	391
				Laura 9th of Melrose	5551	20.11.20	273	19½	6,582	6·22	409·27	250	466½
				Lassie Fowler 7th of Melrose	7542	27.11.20	273	20½	6,371	5·77	367·90	200	419½
				Jessie 13th of Melrose	5544	1.12.20	273	16½	5,223	5·98	312·13	250	355¾
				Jessie 20th of Melrose	7541	15.12.20	273	19½	6,351	6·25	397·02	250	452¾

ANNUAL FIELD DAY AT LONGERENONG COLLEGE.

The Eighth Annual Field Day at Longerenong College, organized by the Horsham Agricultural Society and the Council of Agricultural Education, was held on 19th November, and was attended by over 300 farmers from the surrounding district, and from places more remote, such as Nhill, Rupanyup, St. Arnaud, Kewell, and Wartook.

The Department of Agriculture, which controls the wheat-breeding station at the College, was represented by the Director of Agriculture, Dr. Cameron, the Superintendent of Agriculture, Mr. A. E. V. Richardson, and Mr. I. M. Tulloh, who has charge of the plots; and the Council of Agricultural Education by the Chairman, Hon. J. J. Carlisle, M.P., and Messrs. Osborne, Grant, Sinclair, and Purvis (Secretary).

Mr. A. S. Rodgers, Assistant Minister of Repatriation, and Mr. M. E. Wettenhall, representatives of the district in the Federal and State Parliaments respectively, were also present. After the visitors had been welcomed by Mr. Carlisle, Mr. Richardson addressed them, detailing the results that had been obtained in wheat-breeding and in the various experiments made at the College.

The plots were then visited, Mr. Richardson supplying information and answering continuous inquiries. A practical demonstration in hybridizing excited great interest amongst the observers.

During the afternoon Mr. Rodgers, M.H.R., congratulated the principal, Mr. Drevermann, and the Department on the general appearance of the college and the experimental plots. Dr. Cameron, in replying on behalf of the Department, referred to the very keen interest always shown in agricultural questions by the late Mr. Weldon Power. He also said that it was not out of place on such an occasion to bring under notice the fund for the establishment of a permanent memorial to the late William Farrer, whose labours had been of so much value to Australian wheat-growers.

Mr. Sinclair made special reference to a wheat selection from Federation, which had been raised at the college, and which he regarded as a most promising one.

Mr. Learmonth, the president of the Horsham Agricultural Society, said his society appreciated very fully the benefits arising from having the college and plots located in the district, and recognised the great work that was being done. Mr. Wettenhall, M.L.A., in the course of a brief speech, referred to the support that the society and the people of the district generally had given to the college.

The area set aside at the college for experimental work totals 98 acres, and consists of six fields of 14 acres each on the south side of the avenue, and a permanent rotation field, also of 14 acres, opposite them on the north side. The six fields are side by side, and the soil is of uniform character, consisting of what is commonly called "Wimmera black soil." Each year two fields are sown with wheat, two are in pasture and two fallowed. The experiments this year are being conducted in fields 25 A and D, while 25 B and C are in pasture and 25 E and F are in fallow.

The experiments which have been conducted during the last twelve years comprised—Manurial trials, Variety tests with wheat, oats, and

barley, Forage crops, Graded seed tests, Time of sowing trials, Date of seeding tests with wheat, Pickling tests with various commercial fungicides, and Flax trials. In addition to these a series of eight rotations is being tested in the permanent rotation field, and this is now in the fifth year. Concurrent with these tests much work has been done in the improvement of varieties by selection, and the production of new varieties by cross-breeding.

Mr. Richardson addressing the Gathering.

Manurial Trials.

Field 25 D, fifteen plots, each one-twelfth of an acre. Sown on 12th July at rate of 75 lbs. Federation seed per acre, and manured as follows:—

	Average yield per acre for seven years.
No manure	25 bushels
Super., ½ cwt.	31.35 „
Super., 1 cwt.	31.97 „
Super., 2 cwt.	33.49 „
Super., 1 cwt., and Lime, 5 cwt.	28.95 „
Super., 1 cwt., and Lime, 10 cwt.	29.33 „
Super., 1 cwt., and Nitrate of Soda (with seed), 40 lbs.	28.7 „
Thomas' Phosphate, 1 cwt.	25.94 „
Super., 1 cwt., Nitrate of Soda, 40 lbs., Pot. Sulphate (40)	30.76 „
Super., ½ cwt., Thomas' Phosphate, ½ cwt.	29.65 „
Super., 1 cwt., and Nitrate of Soda (in spring), 40 lbs.	30.4 „
Farmyard manure, 10 tons	30.08 „

It will be seen that in the past, 2 cwt. of super. per acre has proved the most profitable application of manure on this heavy soil. Taking the price of wheat at 4s. per bushel, it has resulted, over an average of seven years, in a profit of 24s. per acre above the unmanured plot; while 1 cwt. of super. showed a net profit of 22s. 10d. per acre during the same period.

Stud Cereals.

This section is sown by hand in rows 1 chain long, 32 inches apart, and with 4 inches between the seed. Rows 1-80 are sown with different varieties of wheat. These are used for crossing and, at the

same time, are being subjected to individual selection, and they include a number of varieties received from abroad. Rows 81-309 are sown with crossbred wheats now in the fifth generation, which are being subjected to selection in order to "fix" the various types before being tried under field conditions. Rows 310-328 contain crossbred barleys also in fifth generation, and among these are some promising types. Twenty-one varieties of oats have been sown in rows 329 to 350.

In sub-section H, rows from 1-50 are varieties and fixed new crossbreds which have been sown with seed taken last year from the best selected plants of these. The seed harvested from these plots will next year be sown in the "selection plots," while, again, the best single plants will be reserved from each row for sowing this section next year.

Rows 51-150 contain crossbred wheats, some of which are not yet fixed, and are being subjected to selection. In sub-section K are selected plants of four varieties of barley, sown in rows 151-154, for raising pure seed for selection barley plots next year. Rows 155-162 contain crossbred wheats in second generation. 165-236 have been sown with

At the Manurial Plots.

newly imported wheats tested alongside of same varieties growing here for a number of years, while in the alternate rows a number of selections of Wimmera rye grasss has been sown. It has been noticed that this grass contains many types, and in order to split up the types and determine the most useful of them these selections have been made, and each row is sown with seed selected from individual plants. From the variations among the plants in the same rows it is evident that inter-crossing has been going on among the various types, and it is expected that some useful grasses will be obtained from this course.

Selection Plots.

Each one-fortieth of an acre. Seed 75 lbs. per acre. Super. 1½ cwt.

		Sown.
Field 25 D—Plots	1-36	13th July
„	37-42	14th July
„	43-66	15th July
„	67-90	18th July
Field 25 A—Plots	91-102	12th June
„	103-132	13th June
„	133-144	14th June

Of these 144 plots 19 are sown with standard varieties, and the remaining 125 with new crossbred wheats. Two check plots of Federation and one of Gallipoli have been sown in each section for comparison. The standard varieties are grown for the purpose of raising pure seed wheat. It was mentioned above that these plots are sown with seed grown in rows in the stud cereal section last year. The seed from these will next be sown in the half-acre plots, and the year following the produce will be sown in the field in areas of from 10 to 16 acres. The history of the seed wheat sold from the college farm this year can be shown thus—

1917—Best selected plant, sown in one single row.
1918—Seed from single row, sown in selection plot (one fortieth acre).
1919—Seed from selection plot, sown in half-acre plot.
1920—Seed from half-acre plot, sown in field of 10 to 16 acres.
1921—Distributed to farmers as seed wheat.

Inspecting New Crossbred Wheats.

It will thus be seen that the seed sold annually is traceable back to a single plant.

Of the new crossbred wheats some are very promising ones. In these plots last season, ten of them exceeded the yields of the check plots of Federation by 2 to 18 bushels per acre, while a number are being tried under these conditions for the first time.

Rate of Seeding Tests.

Field 25 A. Plots one-fortieth acre. Federation seed, super. 1½ cwt. per acre.

Ten plots, five sown early (3rd June) and five sown late (18th July), with following rates of seed per acre:—45, 60, 75, 90, and 120 lbs. per acre. The returns for the last eight years show that for both early and late sowing seeding at the rate of 75 lbs. per acre has been the most profitable.

Selected Barleys.

Sown 18th July, seed 60 lbs. per acre, super. 1 cwt. per acre. These were sown in four plots, two of six-rowed barleys (Oregon and Shorthead) and two of malting varieties (Pryor and Gisborne). Barleys have done consistently well, and have proved very profitable crops during the last nine years. Numerous selections have been made and tested during that period, but the four varieties mentioned have proved to be the most suitable for local conditions. Yields are—

	Highest yield per acre.	Average 5 years.
Oregon	80.7 bushels	45.7 bushels.
Shorthead	74.5 bushels	41.3 bushels.
Pryor	67.0 bushels	50.0 bushels.
Gisborne	71.75 bushels	49.9 bushels.

These are sown late in the season to prevent too rank growth. However, the favorable season this year has caused a taller growth than usual, and a recent heavy storm caused the plots to be laid badly.

Time of Sowing.

In this test are eighteen plots, nine of which are sown early and nine sown late. Six varieties of wheat were used, two early varieties, two mid-season, and two late. The early sowings were made on 3rd June and late on 18th July; 75 lbs. seed and 1 cwt. super. used per acre. The results over an average of four years are shown hereunder—

Variety.	Early Sowing. Bushels.	Late Sowing. Bushels.	Difference in Favour of Late Sowing. Bushels.
King's Early	30.6	35.7	5.1
Bunyip	28.3	32.8	4.5
Federation	35.2	38.9	3.7
Marshall's No. 3	28.9	34.8	5.9
Dart's Imperial	28.4	33.6	5.2
Yandilla King	33.1	36.2	5.1

Selected Seed Plots.

Fourteen plots, seed 75 lbs., super. 1 cwt. per acre, sown 6th and 7th July.

1. Yandilla King, ½ acre.
2. Major, ½ acre.
3. Graham, ½ acre.
4. Minister, one-third acre.
5. Huf's Imperial, one-third acre.
6. Selection 1, one-third acre.
7. Dollar, one-third acre.
8. Crossbred 12, one-third acre.
9. L 7080 B6, one-third acre.
10. L 7080 B20, one-third acre.
11. L 7080 B1, one-third acre.
12. L 7063 B1, one-third acre.
13. Gallipoli, five-sixths acre.
14. Federation, one-third acre.

Permanent Rotation Field.

No. 7C Paddock.

In this field are 23 plots of ½ acre each, and on them eight different systems of rotation are being tested.

Series A—Plot 1, wheat continuously.

Series B—Plots 2 and 3, wheat and bare fallow.

Series C—Plots 4, 5, and 6, wheat, pasture, and bare fallow.

Series D—Plots 7, 8, and 9, wheat, barley, and peas.

Series E—Plots 10, 11, and 12, wheat, oats, and peas.

Series F—Plots 13, 14, and 15, wheat, oats, and bare fallow.

Series G—Plots 16, 17, 18, and 19, wheat, oats, pasture, and bare fallow.

Series H—Plots 20, 21, 22, and 23, wheat, rape, barley, and peas.

These tests were commenced in 1917, and during the last three years Wimmera rye grass has been used in the pasture tests in series C and G, and very fine pastures have resulted. The rape and peas were sown early in April, and grazed off early in spring, and then ploughed in. This season the peas yielded 7½ tons of green stuff per acre. Although wheat is the main crop, the yield is not the sole guide, as other crops in each rotation have to be considered, and the net profit per acre of each rotation calculated. The influence of the various crops on those succeeding them and their effect upon the soil can only be determined after a number of seasons, and until then no definite results can be obtained. The following are the wheat yields:—

	Yield 1920. Bushels.	Average for 3 years. Bushels.
Series A	23.3	13.3
Series B	44.1	32.1
Series C	45.5	35.9
Series D	36.6	26.2
Series E	38.8	26.9
Series F	40.0	32.7
Series G	42.1	35.0
Series H	35.0	28.2

It will be noted that the highest wheat yields have been obtained from the rotations that include bare fallow, and the best among these occur where the fallow is preceded by a year of pasture. Up to the present the rotation giving the highest net profit is the half-and-half system, *i.e.*, bare fallow and wheat, which is closely followed by the three-year rotations C and G. Though the two-year rotation is the most commonly practised, and up to the present found the most profitable for heavy soil, it has not been proved whether the continuance of the practice over a period of years will not have a serious effect on the soil's fertility. At the same time it gives little opportunity of dealing effectively with diseases such as "take-all" and "flag smut," while the mechanical nature of the soil may also become impaired.

Wheat Yields, Season 1920-21.

	Area.	Yield per acre.
Federation	207 acres	37½ bushels.
Gallipoli	30 acres	46½ bushels.
Dart's Imperial	9 acres	29 bushels.
Yandilla King	5 acres	38 bushels.
Major	5 acres	36 bushels.
Minister	3 acres	33 bushels.
Graham	3 acres	40 bushels.
College Eclipse	3 acres	30 bushels.
Canberra	3 acres	30 bushels.
Dollar	3 acres	40 bushels.

Average yield per acre, 38 bushels.

Average yield per acre for six years, 33½ bushels.

Rainfall for year, 1,509 points.

Rainfall during growing period, 11 inches.

Manure used, 90 to 112 lbs. super. per acre.

Seed sown, 80 to 90 lbs. per acre of graded seed and pickled with formalin (1 lb. to 40 gallons of water).

Seed Plots.

	Area.	Yield per acre.
Warden	1⅓	36 bushels 38 lbs.
Federation	1	43 bushels 32 lbs.
Gallipoli	¾	45 bushels 27 lbs.
Dart's Imperial	⅓	42 bushels 26 lbs.
Graham	⅓	49 bushels 30 lbs.
Major	⅓	47 bushels 3 lbs.
Minister	⅓	45 bushels 23 lbs.
College Eclipse	⅓	40 bushels 0 lbs.
No. 12 Crossbred	⅙	59 bushels 7 lbs.
No. 146 Crossbred	⅙	59 bushels 0 lbs.
No. 10 Crossbred	⅙	53 bushels 53 lbs.
No. 8 Crossbred	⅙	52 bushels 50 lbs.

Seed sown—85 lbs. per acre.

Super.—112 lbs. per acre.

THE GEELONG CALF CLUB.

A VICTORIAN INNOVATION.

(By J. S. McFadzean, Senior Dairy Supervisor.)

The residents of Geelong city each year hold a Gala Day, by which they raise funds both for local charities and for carrying through projects of public utility. In making the arrangements for the 1921 gala the committee was casting round for some new idea which would increase the attraction, when Mr. D. F. Griffiths—who is a member of the old-established firm of Harwood and Pincott, solicitors—suggested the formation of a Calf Club—a movement which has met with great success in several centres throughout America in which dairying is carried on. In doing this, Mr. Griffiths aimed at bringing out something which would interest the residents of the rural districts surrounding Geelong, rather than the townspeople.

The idea is to select each year a few lads and girls, who will take sufficient interest in dairy stock to give full attention to raising a calf, and present one to each of them under certain conditions. These are that the calf is to be properly fed and cared for; to be exhibited at successive Gala Days; to be suitably mated to a pure bred sire, and to be tested for its dairy production under an approved herd-test system; the lad or girl receiving the calf, together with a parent or guardian, signing an agreement not to dispose of the animal until these terms have been carried out to the satisfaction of the club committee. The calves will be inspected occasionally, and the club will award prizes to those who rear them best.

The proposition is educational, in that the competition between each of the owners of these calves will encourage them to study the best methods of feeding and handling stock. It will also lead them to take full interest in herd-testing, and in the individual butter and milk production of heifers and cows. Further, not only will the young people receiving these calves become interested along these lines, but that interest must extend to those around them, and thus the educational advantages are certain to be widespread.

The success of the scheme rests, first, on the promoters being able to obtain pure-bred calves of good dairy quality to distribute, and then on the calves being placed with those who are both able and willing to give the animals the desired attention.

It was only a few weeks prior to Gala Day that Mr. Griffiths conceived the idea of trying out this Calf Club; and, as the Gala Committee had no funds wherewith to purchase calves, an appeal was made to such breeders of pure dairy stock as were more or less interested in Geelong. Considering the short notice that was given, cattle breeders responded handsomely. The gala is held usually towards the end of October, and at that date breeders frequently have orders in hand covering all the young stock they have for sale, often orders being booked for them many months before the stock are born. The gift of several calves to this scheme at so short a notice thus probably meant the cancellation of orders, to the inconvenience of customers and monetary loss to the

donors, for the gift of a pedigreed dairy heifer from herd-test stock represents a fair amount of cash. By Gala Day nine calves had been promised in this instance, and two of these were presented by one breeder, so that on the generosity of those eight donors rests the credit of having made possible the carrying through of this first Calf Club movement in Victoria.

As some slight set-off to the handing over to the Gala Committee of a valuable calf, a certain amount of local advertisement was permitted such of the donors as chose to take advantage of the opportunity on Gala Day. Each calf was conveyed in a crate on a separate vehicle throughout the procession which traversed the principal streets of Geelong on that day, and over each crate there was a useful advertising space. Also each breeder was invited to parade his stud stock; and as they could then display ribbons and cards won at all agricultural shows, the occasion allowed of the excellence of the cattle being brought well under the notice of the public.

A trophy valued at five guineas has been donated to the club by Mr. J. J. Baker, of Bannockburn, as the prize to be competed for by those who were this year presented with a calf. The calf has to be paraded on three Gala Days (when points will be awarded for the condition of the animals), and the winner of the highest number of points over the three parades will receive the trophy. The calves will also be inspected at various times between parades to note what progress each is making. The names, ages, and addresses of those who received the several calves, together with the donors' names in each instance are as follows:—

Donor and Address.	Breed of Calf.	Recipient, Age, and Address.
Mr. Geo. Madden, Batesford ..	Ayrshire ..	David McLean, 14 years, Bellarine
Mr. A. W. Jones, Geelong ..	Friesian ..	Reginald Dendle, 14 years, Leopold
Department of Agriculture, Werribee	Red Poll ..	Ethel R. Gillett, 14 years, Lara
Mr. A. W. Jones, Geelong ..	Jersey ..	Ernest Evans, 14 years, North Shore
Senator Guthrie, Geelong ..	Red Poll ..	John W. Baker, 14 years, Russell's Bridge
Mr. A. Gerrand, Sale	Ayrshire ..	Isobel Lugg, 14 years, Waurn Ponds
Mr. E. Bent, Geelong	Jersey ..	J. W. Hose, 12 years, Grovedale
Mr. W. P. Brisbane, Weerite ..	Ayrshire ..	Charlotte A. Blyth, 14 years, Connewarre
Messrs. Callery Bros., Gheringhap	Ayrshire ..	Herb. R. Batson, 12 years, Winchelsea

Since then a tenth calf has been donated, viz., a milking Shorthorn from Messrs. Kerr Brothers, of Bacchus Marsh, but word is not yet to hand as to who has received it.

The breeding of some of these calves is as follows:—

Mr. Madden's Ayrshire—by General Bracken from Mirth of Struan Park.

Mr. G. W. Jones' Friesian—by Westmere Prince Mercedes from St. Albans Pauline.

Department of Agriculture's Red Poll—by Jimmy Gold Leaf from Pacifica.
Mr. A. Gerrand's Ayrshire—by Barrister of Raith from Charity.
Mr. W. P. Brisbane's Ayrshire—by Patriot of Brook Hill from Specialty.
Messrs. Callery Brothers' Ayrshire—by X-Ray of Gleneira from Mona of Langley Park.
Messrs. Kerr Brothers' Shorthorn—by Morven Weston Comet from Morven Duchess 15th.

The full pedigrees and performances of the parents of the rest of the calves are not to hand, but the dam of Messrs. Kerr Brothers' Shorthorn has won first prize in the Bacchus Marsh show ring five years in succession. She has also given 933 gallons of milk and 349 lbs. of butter fat in 273 days in the Government test, and won first prize for quantity in a one-day milking test at Bacchus Marsh show with 57 lbs. of milk. The Red Poll Pacifica, dam of the departmental gift calf gave 625 gallons of milk and 279 lbs. of butter fat on her second calf; while Mr. A. W. Jones' Friesian Pauline gave 993 gallons of milk and 403 lbs. of butter fat, both of these records being in the nine months' Government test.

The system to be employed in selecting the best from amongst the many applicants gave rise to much deliberation, and finally the names of those from each shire were forwarded to the respective municipal councils, with the request that the President should place in order of choice up to four of those considered to be most likely to carry through the requirements of the club in regard to proper care. This done, the committee arranged for the final selection, and in each instance the lad or girl receiving a calf got one of the breed he or she asked for. When the committee saw that at least six calves would be available for distribution, circulars regarding applications were forwarded to sixty State schools in the six shires of Corio, Bannockburn, Winchelsea, Barrabool, South Barwon, and Bellarine. One hundred and thirty-eight applications resulted—63 being for Ayrshires, 37 for Jerseys, 21 for Red Polls, and 17 for Friesians—showing that there were quite a number of farmers only too ready to allow their children to give special attention to a good calf if they were fortunate enough to obtain one.

It seems probable that this Calf Club movement will be taken up in many of the dairying districts, but it is too much to expect that any club can be continued for any length of time on the basis of voluntary donations of heifers. In no district is the number of breeders of high class dairy stock sufficiently large to expect that a club could be run continuously by the voluntary contribution of calves. This is a fact which club committees should remember, and they will have to devise some means of collecting money to buy up suitable calves when the number donated falls below the requirements. Breeders might occasionally sell a calf to such clubs at a reduction on the market value so long as they were not actually out of pocket by rearing it at the price obtained. Calves such as those already donated for this Geelong club are, on their breeding, of high dairy value as compared with average farm stock. In fact, no one is likely to offer any but a good

calf to these clubs on account of the prominence each will give to the breeder. The Arab adage of "never looking a gift horse in the mouth" will certainly not be followed in the case of these calves; for both breeding and dairy pedigrees of all will be closely examined by hundreds of people, and a dairy valuation made accordingly.

However, if a sufficient number of breeders of pure stock in each district can be induced to sell calves to the local clubs, even at a purchase price based on the dairy pedigree of the parents, the scheme has great possibilities. If the idea was solely carried out by placing pure-bred bull calves in herds where now only cross-bred bulls are used, it would be a big step towards improving the dairy quality of Victorian cattle. Pure-bred bulls will raise the dairying quality of the heifers above that of their dams in each successive generation; and prizes could well be given for groups of heifers bred from club bulls. American breeders, and others interested in the progress of agriculture there, have been carrying out a "Better Bull" campaign for several years past, and the matter has already been taken up in South Australia. It will be to the advantage of every breeder of pure stock to encourage this line of action here.

Compared with the number of breeders of pure cattle in America there are comparatively few in Victoria who are in a large way of business, yet the success which has attended this first Calf Club effort shows that breeders here are favorably disposed towards it. Not only have ten calves been donated for the 1921 distribution, but three more have been offered for the 1922 gala; and three breeders have also offered the service of stud bulls for the suitable mating of these calves when they reach the proper age. The representatives of Meggitt's Limited and the Maize Products Company each donated a bag of their prepared calf food to the recipients of the several calves, thus showing their approval of the idea; and letters of appreciation of the Geelong venture have been received by the committee from many sources.

Whatever the future has in store for this Calf Club movement it has everything to commend it. Better breeding methods, better feeding, and an ever increasing recognition of the value of herd-testing must result from the work of such clubs. Properly placed, each calf should prove a live advertisement for pure stock of some class in its respective locality, and breeders generally will benefit thereby, and dairy stock improve. It is to be hoped that Mr. Griffiths and the Geelong Calf Club will have the satisfaction of seeing their example being followed effectively, even if it hastens the day when every calf donated has first to be purchased with funds especially raised for that purpose.

GRASSING GOLF LINKS AND RECREATION FIELDS.

What has been Done by the Royal Melbourne Golf Club at Sandringham.*

H. A. Mullett, B. Ag. Sc., Chief Field Officer.

The number of playing fields in Australia is legion, and their size is characteristically large. That is a matter for congratulation—not so the state of their surfaces, which more often than not are imperfectly prepared and exceedingly rough compared with old-world standards. The links of the Royal Melbourne Golf Club at Sandringham and the Oval at the Melbourne Cricket Ground are, however, notable exceptions. The wonderful carpet of grass which is maintained at all times of the year on these areas has excited general admiration. But few realize that it is the result of careful planning and scientific treatment. It would be difficult to find a poorer soil in the State than that on which the Sandringham links are placed, nor a more apparently hopeless one on which to establish a high-class turf. In its virgin state it is covered with a dense thicket of ti-tree. When this is cleared a growth of hardy shrubs and herbaceous vegetation such as sedges and cutting grass, tends to replace it. Grasses establish themselves only with the greatest difficulty, yet, within a few months of the appropriate amelioratory treatment, one may walk over a springy cushion of fine dense turf, which forms an ideal surface for golf. And in that condition it can be maintained indefinitely by judicious management.

Laying Down the Fairways at Sandringham.

It will, of course, be understood that the treatment given here applies specifically to poor sandy soils, similar to Sandringham. On these, however, many of our leading recreation reserves are located.

At Sandringham the laying down of the turf and its after-management is in the capable hands of Mr. M. A. Morcom, the green-keeper, who has been employed at the Links for the past eighteen years. To Mr. Morcom's efforts and to the fact that on the council of the club is Mr. J. W. Trumble, who is a well-informed and enthusiastic advocate of top-dressing, the successful formation and maintenance of the high quality of the turf is largely due. The club has been located at Sandringham since 1901, and in bringing the extensive course on its 150 acres under grass, and in maintaining it in condition, a great deal of valuable experience has been accumulated. Prior to 1912 various troubles had to be fought, but following on the modified course of top-dressing adopted, most of them have disappeared.

The practice now adopted at Sandringham for laying down new areas and maintaining them is as follows:—The ti-tree is grubbed,

* The Melbourne Golf Club was formed in 1891, and opened on the Caulfield Links in the same year. It was during the captaincy of Mr. Thomas Brentnall in 1895 that the distinct title of Royal was conferred on the Club by Her Majesty Queen Victoria. In 1901 the Club moved to its present picturesque home at Sandringham, 12 miles from Melbourne.

the land is then ploughed, and worked down with the harrows. The process is repeated several times with the object of thoroughly cultivating and sweetening the soil. As many as three or four ploughings are given and from ten to a dozen strokes with the harrows. It has been found that this thorough tillage is a most important factor in the successful establishment of the grass. No success can be expected until the soil has been well aerated and the fibrous roots of the ti-tree thoroughly rotted. Finally agricultural lime at the rate of 10 cwt. per acre is applied to the surface.

In the spring, preferably in October, the land is reploughed and the runners of couch grass (*Cynodon dactylon*) carefully sown. The method of planting is to lay them on the partially turned sods as each furrow is ploughed. The next sod covers them. The runners are placed close together. Usually a dray load is required for each 300 square yards, that is about 20 loads per acre. The runners are obtained by skimming an old stand of the grass with a shovel to a couple of inches deep. The handling they receive in carting separates them sufficiently well for planting.

Mr. Morcom regards it as most important that no roller should be used for some months after the couch is sown, as it is found that it makes phenomenally rapid growth in the loose soil. With this treatment there is usually a good sward of grass by January. Then the grass is cut and the roller used. Rolling should be repeated at intervals, so that a smooth, firm surface may be obtained.

Towards the end of the summer the couch becomes less vigorous, and when cut the loose sand will show through the, as yet, thinnish stand. This is then seeded with Kentucky Blue grass (*Poa pratense*) at the end of March at the rate of half-an-ounce per square yard, which is over 4 bushels per acre, and top-dressed ½ an inch deep with light soil. This grass, together with Annual Meadow grass (*Poa annua*) which comes naturally, forms the autumn and winter turf for the links when the couch is dormant. The roller is then vigorously applied to give the firm seed-bed that English grasses require.

Laying Down the Greens.

For the greens, instead of Kentucky blue, Chewings fescue (*Festuca duriuscula*) is used at the rate of from one-half to an ounce per square yard.

After-management.

Cutting.—Regular cutting is given with grass-mowers of the horse-drawn type, which are provided with fairly heavy rollers. The cut grass is often allowed to remain on the surface. This is a most desirable practice from the point of view of adding to the meagre stores of humus in the soil.

Top-dressing.—Judging by the results obtained by top-dressing natural pastures on the famous park lands at the Rothamstead Experiment Farm in England, and by the results of tests on pastures conducted by the Department of Agriculture in Victoria, there can be no

doubt that the splendid sole of grass on these links is largely due to the liberal and systematic top-dressing of fertilizers applied. In the Western District it has been shown that by a moderate dressing of lime and superphosphate a poor, thin, mossy, natural pasture can be transformed into a luxuriant one without cultivation or the application of any seed whatever. The quantity of grass in one experiment was shown to have been increased about three times, and further, it was shown that each of the fertilizers has the power of rapidly fostering a special type of herbage. Thus fertilizers largely phosphatic or potassic encourage clovers; fertilizers, largely nitrogenous, certain of the grasses, and so on. To secure the best results, therefore, liberal doses of fertilizer are necessary, but they must be carefully chosen. The following practices have been found most satisfactory at Sandringham:—In autumn the putting greens may be dressed in one of two ways; one of them is to apply 6 cwt. lime per acre, and a compost made up of 4 cwt. special grass manure containing 12 per cent. phosphoric acid and 4 per cent. nitrogen and two cart-loads of soil; 6 cwt. of lime per acre is also dressed on all fairways, together with grass manure at the rate of 3 cwt. per acre. In the spring each green is again dressed, this time with a purely nitrogenous manure containing 1 cwt. of blood and 10 lbs. ammon. sulphate. This is mixed with two yards of light soil before application. Finally, a third dressing of pure sea sand is given to the greens to level up any spaces that may appear between the grass. It will thus be seen that the greens receive three routine top-dressings per annum and the fairways one. The fairways for the first few years after laying down, however, are treated exactly as the greens, thereafter they receive only one dressing, and that in the autumn. The other autumn dressing which is sometimes applied to the greens is composed of limed soil 10 parts, dung 2 parts, gypsum 2 parts, and bonedust 2 parts. The lime is added to the soil during the summer and thoroughly incorporated. The proportion is one of agricultural lime to ten of soil. The dung used is cow dung, which is pitted, &c., and allowed to ferment under a layer of soil for about six months. The various ingredients are then mixed and kept in a moist heap for a few weeks before the application. The resultant compost is one rich in bacterial life and in ammonia.

Treatment of Weeds, etc.

The only weed which has given much trouble so far at Sandringham is the flat carrotweed (*Plantago coronopus*). When thick, this crowds out the couch. Infested patches are ploughed in September and resown with couch after being limed. By January there is a good stand of the grass. Rat-tail grass (*Sporobolis indicus*) is another weed which has just begun to show. Cape weed was prominent before the systematic top-dressing was practical.

At times grubs appear in the fair-ways and are effectively dealt with by means of an arsenate of lead spray (1 in 150).

If earth worms appear on the greens, Carter's weed killer is applied at the rate of ¼ lb. per square yard in damp weather.

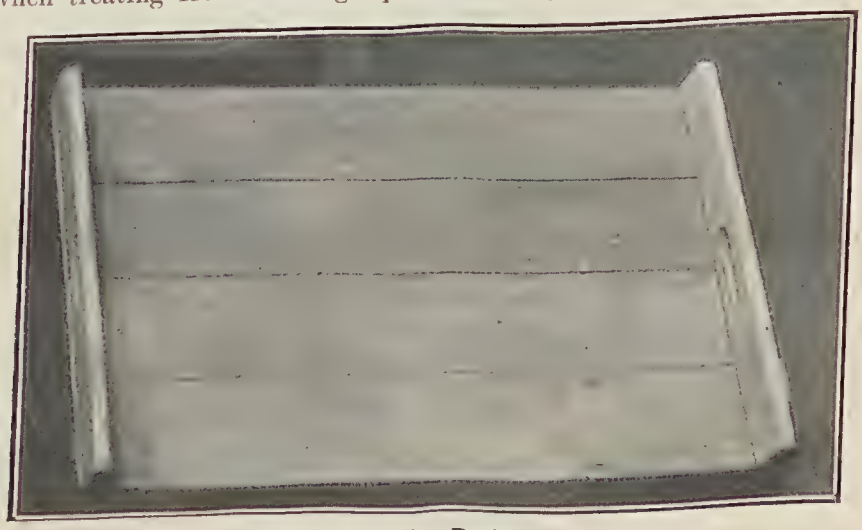
FRUIT DRYING FOR HOME USE.

By Miss A. Knight, Fruit Preserving Expert.

The drying of fruit or vegetables for home use requires no expensive outlay for utensils, &c.

The general principle involved is the removal by evaporation, without injury to the fruit, of sufficient moisture to insure its preservation. This moisture may be driven off by exposing the fruit to the sun's rays, the wind also playing a part, or else by artificial heat.

For sun-drying purposes, either the rack system or trays may be used. The former method requires a wooden rack of suitable width and height, with cross-pieces at convenient distances, over each tier of which are stretched sheets of hessian, and the prepared fruit is left thereon until sufficiently dried. This system is generally used, however, when treating fruits in large quantities only.



Tray for Sun-Drying.

Trays of a convenient size for the purpose may be made by joining together four 6-in. x ½-in. lining boards 36 inches long, and nailing to them at each end a cleat 2 feet long by 1 inch wide and 2 inches deep, making the finished tray 36 inches x 24 inches; but, whatever measurements are decided upon, these should, for convenience in handling and stacking, be of uniform size.

Fairly effective drying may be done indoors, either in an oven with the oven door partly open, or preferably by a small "Home evaporator." The evaporator should be of a size that will fit on a range or in a fireplace, and it should be fitted with wire trays placed as shelves. It may be either suspended over, stood on, or even hung in the vicinity of, the kitchen range where currents of heated air will pass over and about the product, gathering the moisture and carrying it away.

One measuring 24 inches high by 24 inches wide and 18 inches deep should be found a useful size.

The material required for the frame would be—

Four corner uprights, 26 inches x 1½ inch x ⅞ inch.
Four end pieces (two for each end of frame), 18 inches x 1½ inch x ⅞ inch.
Four pieces (two each for back and front), 24 inches x 1½ inch x ⅞ inch.
Sixteen tray rests (eight for each side), 18 inches x 1 inch x 1 inch.

Trays for the above may be made by first making a frame of two pieces of 22 inches x 1 inch x 1 inch and two of 18 inches x 1 inch x 1 inch, and then tacking to this a square of wire gauze, fastening it on more securely with narrow laths.

Preparing Apples for Drying.

To suspend the evaporator, a wire may be fastened to each top corner, and the four wires made to meet in a centre ring. If this method be impracticable in any place, the way that convenience dictates may be followed.

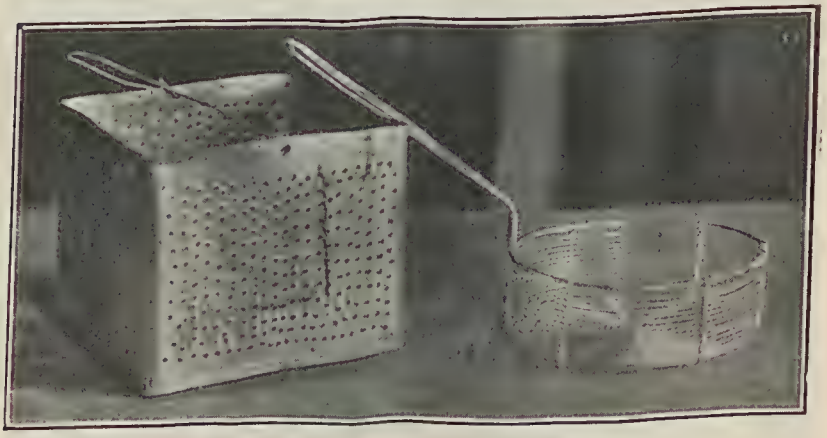
If stood on the stove, four supports or feet should be placed underneath the evaporator, so as to lift it high enough to prevent burning.

Preparation of the Product for Drying.

Some varieties that are dried whole, including grapes, prunes, figs, &c., are usually dipped for a few seconds in a boiling solution of lye, which cuts the bloom and causes minute cracks to open on the surface of the skin, through which the moisture escapes more readily than if the fruit were not dipped, thus hastening the drying process.

Dipping the Fruit.—The lye solution is made by dissolving 1 lb. of caustic soda in 16 to 20 gallons of water, the strength varying according to the kind of fruit under treatment. If used too strong, or the fruit left too long in the solution, the skin will probably burst, making the finished product less presentable, and liable to sugar more quickly. It would be advisable for the operator to experiment with several small lots by immersing the first for from ten to fifteen seconds, and if, on examination, the skin remains intact, fresh specimens should be steeped for three or four seconds longer, or, if overdone, then for a few seconds less. The cracks or checks in the skin should be no larger than would be just visible to the naked eye. The fruit should be rinsed by passing it through a clear cold-water bath after it comes from the dipping solution.

An ordinary household washing copper would serve as a dipping vat. A wire basket or perforated cage will be necessary to hold the fruit during the dipping operation; a large billy or petrol tin cut down and well perforated over both bottom and sides, and fitted with a strong wire handle, will serve the purpose; the perforation should be done from the inside, with a hammer and large nail, so as to avoid any roughness which would tear the flesh of the fruit.



Utensils suitable for dipping fruit in the lye solution.

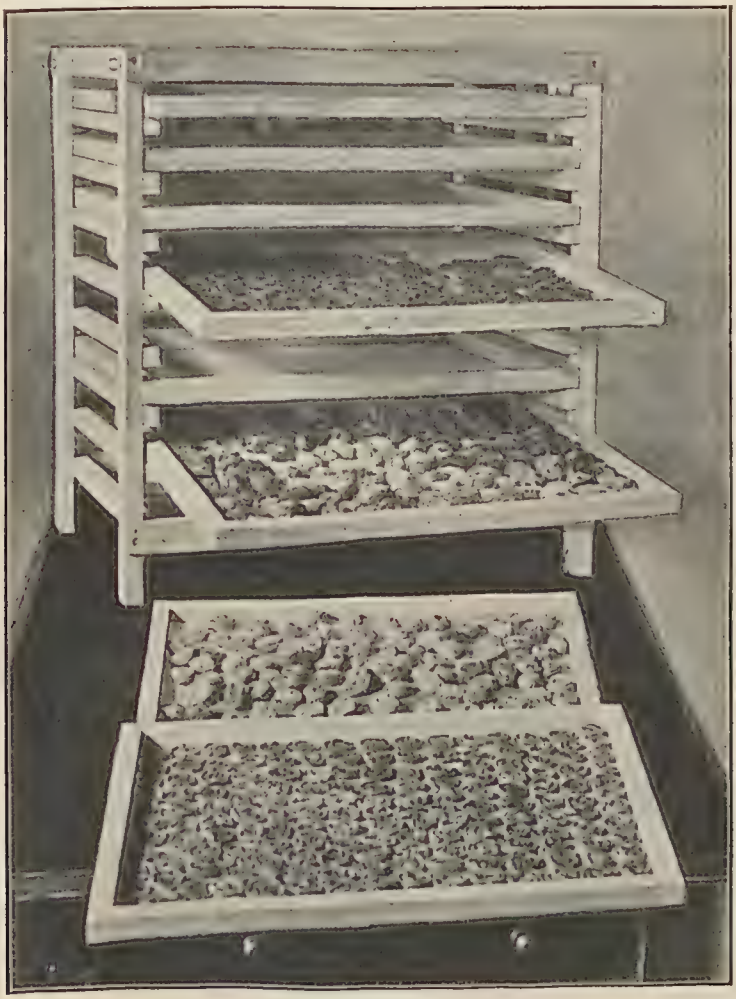
Sulphuring.

All light-coloured fruits have a tendency during the drying process to darken in colour. To prevent this and make the product more attractive, they are usually sulphured. This process is carried out by placing the trays of fruit in a box of a length and width to admit the trays being slipped in or out readily, and of a height to suit requirements, on the sides of which should be fastened cleats 3 or 4 inches apart for tray rests. The fruit is then placed in the cabinet and enveloped with fumes of the burning sulphur.

The amount of sulphur used is approximately in the proportion of 1 lb. to every 100 cubic feet, but depending somewhat on the length of process. The sulphur should be put in a suitable receptacle, placed on the floor of the box, and ignited by a few live coals or other method,

the box or cabinet then closed, and the fruit subjected to the fumes for a length of time depending upon the kind of fruit being treated. When sufficiently sulphured, it is then ready for drying.

Sulphured fruits appear to dry more quickly and with a better texture than the unsulphured, and the process is also thought to give them a certain amount of protection against injury from insect while exposed for drying.



A Home Dryer.

If the fruit is for home use, this operation may be omitted altogether, but if for commercial purposes it will be necessary, as the sulphured product is very much more attractive than the unsulphured.

Drying.

The length of time required for drying varies with the different fruits, sizes of pieces, temperature, weather conditions, and other

influences. If there be any dew or rain, the trays should be stacked one over another, and a cover thrown over the whole as a protection from dampness.

All fruit should be equally dried before packing. To effect this it should be removed from the trays and placed in bins or heaps, so that the overdried specimens may absorb surplus moisture from those not quite dry enough, and thus condition or equalize the whole.

Apricots.

Apricots for drying should be ripe, but not "mushy." They may be dried whole, but are usually cut in halves. The fruit is placed on the drying trays with the cut sides uppermost, and then put in the sulphur-box without unnecessary delay, and sulphured. The length of time allowed for sulphuring differs widely; some give four or five hours, while others allow fruit to remain all night, during which time the fumes gradually die out; therefore, anything from one to twelve hours may be given.

Some determine the time for removing the fruit from the sulphur cabinet by its appearance; this is often known by the depression, from whence the stone has been removed, filling with juice. The trays should then be carefully removed and placed in a suitable position for drying. If they are raised a little from the ground they will dry better than if they are placed flat on the grass.

The period required for drying will largely depend on weather conditions, &c., varying from two and a half to four days, in a few cases even longer.

All pieces of fruit on the one tray do not dry alike, and some of the pieces must be collected from the trays sooner than others. Each tray must be examined occasionally, and those pieces sufficiently dry removed. The appearance and texture of the fruit will be a guide as to whether the drying process has continued long enough. When sufficiently dry, the pieces should be somewhat pliable, yet, when twisted about between the fingers, have no sign of juice nor be in any way mushy. When that stage is reached, they are ready to be "conditioned."

Apples.

Any variety of apple may be used, though cooking apples are best, and white-fleshed sorts, when dried, are the most presentable. They should be fully matured, but not "floury" or "mealy." The apples are usually peeled, cored, and sliced, but are sometimes dried whole with only the core removed. During preparation, the peeled fruit is sometimes dropped into a weak salt solution (about two tablespoonsful of salt to 1 gallon of water) to prevent its discolouring, but it should not be allowed to remain too long in this bath, certainly not after the required quantity is prepared.

It is then sulphured for a few minutes and dried until the slices or rings are soft and velvety to the touch, and of a pliable texture. Another way of judging is to take a handful of the slices, close the hand tightly, pressing the fruit firmly into a ball in the palm of the hand, and, if sufficiently dry, the rings or slices should be springy enough to separate at once on being released; they will then be ready for removal.

Pears.

The "William Bon Chretien" pears are a good drying variety. The fruit may be skinned or not; it is usually halved, spread on trays with the cut side uppermost, and well sulphured, after which the pieces will be quite soft and require careful handling. They are then ready for drying. When sufficiently dry, they should be of a somewhat doughy, stretchy texture, if worked between the fingers.

Peaches.

The yellow, firm-fleshed, free-stone varieties are the best for drying. They are treated in almost the same way as apricots, and the finished article is also tested in the same manner. Peaches, however, usually require a longer time to dry than apricots.

Prunes.

Dark-coloured plums do not need sulphuring, but light-coloured varieties are improved by it. They are selected when fully ripe, and treated with a soda dip as before described, then spread to dry. When finished, they should have a shrunken skin, and the texture should be firm, springy, and pliable if pressed in the hand.

Prunes are improved if glossed. This is done by immersing them (immediately before packing) for a few seconds in a boiling, but weak, solution of either glycerine and water or sugar and water, and then throwing them in a heap, preferably in a dark place, and covering with a cloth for, say, 24 hours, by which time the outside moisture is absorbed. They will then be ready for packing.

Grapes.

Lexias (*Pudding Raisins*).—Ripe "Gordo" grapes are usually selected. They should be immersed for a few seconds in the soda solution and then spread on trays for drying.

Sultanas.

Sultanas are treated in a similar way to Lexias.

Currants.

The bunches should be cut from the vine. They do not require to be dipped. They are placed on the drying trays and exposed to a moderate temperature for drying; where the bunches are thick at the shoulders, the branchlets forming this portion should be opened or spread, so as to avoid dense masses. Where convenient, it is preferable to expose currants to a gentle hot wind without the full glare of the strong sunlight.

Muscatel or Dessert Raisins.

The grapes should not be removed from the stem. They must not be dipped. They should be carefully handled during the picking, drying, and packing, as the retention of the colour and bloom upon the fruit is of importance.

Cherries.

Cherries may also be dried and used as a substitute for raisins. They are sometimes dried whole, but more frequently stoned.

Figs.

Select ripe figs, the riper they are the better will be the flavour. Steep in lye solution as described for raisins, then sulphur and dry. When dried, to prevent their becoming unduly hard, and also to destroy insect life, it is considered advisable, before packing, to dip them for several seconds in a boiling solution of rocksalt and water (about 3 ozs. of salt to a gallon of water), and then place in a heap for a few hours. The salt also has the advantage of counteracting the excessive sweetness of the fig. If tasted soon after steeping, the product may have a salty taste, but in a few days this will be quite unnoticeable.

Mushrooms.

The mushrooms may be dried in a similar manner to fruit, and stored for use when required. Brush the mushroom free from dirt, or peel if preferred; those having fair-sized flaps are the best for drying. Place them on trays or racks, and dry as fruit. Mushrooms, of course, shrink a great deal in the process, but they make a delicious flavouring for gravies, soups, &c., &c., or the dried mushrooms may be cooked in the usual way, if first soaked for a little while. They are excellent for serving with grills, &c.

Dried Tomato.

This is tomato pulp reduced in bulk by boiling until fairly thick. It should then be spread in flat layers or sheets, and dried thoroughly by exposure to the sun and wind, or in an evaporator.

CULTIVATION OF FLAX.

Flax may be grown for the production of either fibre, seed, or, as is commonly done in Victoria, for both. For the production of fine, long fibre, the plant requires a rather slow development with few, if any, sudden checks. Districts where the spring is cool and moist and with a rainfall of upwards of 26 inches (with a good seasonal incidence) are suitable for the production of good fibre. Where the plant is grown for seed only, districts with a rainfall of from 18 to 20 inches will be found suitable.

Soils.

The most suitable soil is a free loamy or chocolate one with a well-drained clay sub-soil. Proper drainage is essential. Good potato land is usually well suited for flax and, generally speaking, satisfactory returns will be obtained under conditions that would produce a good crop of oaten hay. Among the districts that appear to be adapted in both soil and climate for the growth of flax are—Central Gippsland—particularly in the vicinity of Drouin, Warragul, Traralgon, and Morwell; Sale, Koo-wee-rup, Lancefield, Romsey, Kyneton, Ballarat, Colac and Portarlington.

Preparation of the Seed Bed.

The land should be as free as possible from weeds, particularly strong or tall-growing ones, like wild turnip, dock, thistles, &c. If such weeds appear after the flax has commenced to grow, they should be cut or pulled out, otherwise the yield will be reduced and considerable trouble and loss in the treatment of the fibre will ensue. The preparation of the seed-bed is important, and it is necessary that the soil should be well worked to a fine tilth and made as level as possible. This latter point is important, as it enables the binder to work close to the ground and the maximum length of fibre is thus obtained.

Seeding.

The variety of seed commonly grown in Victoria is "Blue-flowering Riga." It is recommended that only good Victorian acclimatised seed should be used, as the results obtained from the sowing of imported seed have been very disappointing. Seed may be obtained from the Secretary, Commonwealth Flax Committee, 314 Albert-street, East Melbourne.

Early sowing is advisable—the most suitable time in Victoria being from the middle of April to the middle of May, though this may be varied somewhat according to locality and seasonal conditions.

For the production of good fibre, seed should be sown thickly, so as to insure tall, unbranched stalks. For this purpose from 60 to 70 lbs. per acre is necessary; it may be either drilled in or broadcasted and then lightly harrowed and rolled. A broadcast effect may be obtained with the drill by removing the tubes and allowing the seed to fall first on to a board set at a slight angle. The seed may be sown from the grain box through the wheat runs. It is not necessary to mix the seed with the fertilizer. If drilled in, it should be sown as shallow as possible, as deep sowing is fatal to good germination.

Where the crop is sown for seed production only, 30 to 35 lbs. of seed per acre should be sown. This thinner sowing allows room for the plants to branch out; more seed bolls are then produced and consequently the yield of linseed is higher.

Fertilizers.

Best results have been obtained with a mixture of bonedust and super. at the rate of ½ to ¾ cwt. of each per acre.

Harvesting.

The crop is ready to harvest as soon as the majority of the seed bolls have turned brown. The stems at this stage are usually of a golden colour with the lower leaves beginning to drop off.

As pulling is impracticable in Australia, the crop is cut with a reaper and binder in the same way as an ordinary hay crop. To avoid loss of length the binder should work as close to the ground as possible. As flax is tougher to cut than oaten hay, the binder knives, which should be plain and not sickle or serrated, must be in good order. The crop cuts most easily in bright clear weather and it is not advisable to start cutting much before 10 a.m. on any day. The sheaves should be of medium size, well-butted and tied securely nearer the head than the butt, as the

tendency is for the twine to slip towards the butt. Long narrow stooks are best and the flax should be stacked as soon as ready, as standing in the paddock longer than necessary causes the fibre to deteriorate.

Necessity for Rotation.

The tendency of land on which flax is grown continuously is to rapidly become "flax sick." This is not due to exhaustion of the soil by the flax, but to the presence, in the soil, of a fungal disease—"Flax wilt." This disease attacks the flax plants at all stages of growth causing them to wilt and die as though for want of water. The only effective remedy is to grow the crop in a rotation system so arranged that flax will not be sown on the same land oftener than once in four years. A rotation frequently practised in the Drouin district is—Potatoes, rape (fed off), flax, oats. Flax does particularly well after potatoes—the thorough working and heavy manuring of the potato land having a beneficial effect on the succeeding flax crop.

WHEAT COMPETITION.

Conditions and Entry Form suitable for use of Agricultural Societies, etc.

The following form issued by the Horsham Agricultural Society is published for the information of other agricultural societies in wheat-growing districts. It relates to a competition for commercial wheat, the conditions being designed so that the exhibits are the ordinary commercial product of the land without special treatment, such as hand-picking, &c.

WHEAT COMPETITION.

For the Best Bag of Commercial Wheat as received from the Harvester. First Prize, £30; Second Prize, £15; Third Prize, £10; Fourth Prize, £5.

(30 Exhibits or no fourth prize.)

Conditions.

The competition is confined to growers who deliver their wheat at the following or at intervening stations:—

Jung to Wail.
Horsham to Vectis.

Variety.

Any variety of which at least 50 acres are grown and harvested for market may be entered.

Choosing Exhibit.

Two members of the Committee of the Society will visit the farm and select from the stack of wheat in the paddock three bags of wheat; these will be sampled with a trier, and the bag for competition selected from these three bags by the competitor or his agent. The bag will then be sewn with special twine, sealed, identification mark affixed, and the exhibitor's entry number stamped thereon. The bag of wheat for competition must be delivered to the society the next day at Horsham from the nearest Railway Station.

Judging.

Prizes will be awarded on points as follows:—

Seventy points for 60 lbs. bushel (two points per pound above or under to be added or deducted, as the case may be).

Fifteen points for purity.

Ten points for general appearance.

Entry Fee.

Entry fee for the competition will be free; the wheat to become the property of the Society.

Closing of Entries.

Entries close on Friday, 9th December, 1921.

E. J. Glenister,
Secretary.

The Secretary,
Horsham Agricultural Society,
Horsham.

Please accept my entry for the best bag of commercial wheat as received from the harvester. The following particulars apply to my entry:—

Exhibitor's Name.....

Locality where grown.....

Variety.....

Sown (date).....Harvested (approximate date).....

Rainfall on Fallow.....Rainfall on Crop.....

Seed per Acre.....Manure per Acre.....

Pickle.....Yield per Acre.....

System of Working Land.....

Signature.....

Address.....

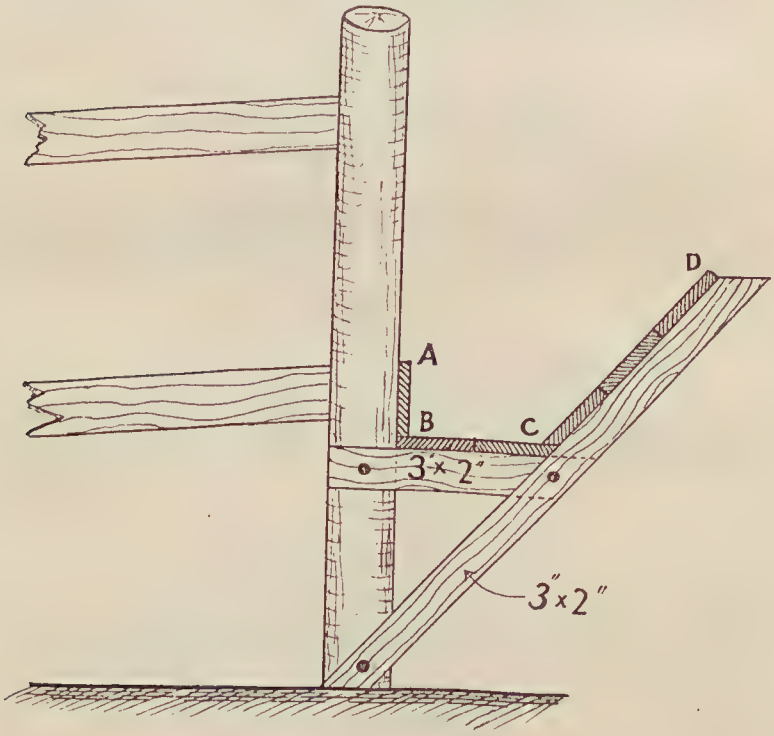
Date.....

A HANDY FEED TROUGH FOR COWS.

(*R. C. Lorimer, Dairy Supervisor.*)

On dairy farms where hand-feeding of cows is practised to any extent, the use of badly-constructed feeders leads to great waste. Frequently the value of the fodder thus lost would, in a very short time, cover the whole cost of a feeder which would reduce the loss to a minimum.

The accompanying sketch will convey the idea of a simply-made feeder which has given entire satisfaction on several farms where it has been installed on the writer's recommendation.



Rough material will serve, but it will be found more satisfactory to use 3 x 2 inch hardwood for the two pieces bolted to each upright or bail post, as shown in the sketch, and 6 x $\frac{7}{8}$ inch T. and G. softwood boards for the body of the feeder. The upright or bail post should be cut out about 1 ft. 6 in. from the floor level, so as to allow the short piece of 3 x 2 inches to fit in level with the edge of the post, where it is bolted. The long piece of 3 x 2 inches is bolted to the post at the floor level, and then bolted to the short piece, 1 foot from the post, along the upper edge

of the short piece. When each post has been fixed in this way, six softwood boards are nailed as indicated by the hatched lines in the sketch, viz.:—A—B one board, B—C two boards, C—D three boards. The lower board C—D will require to be bevelled on the lower edge to allow for the slope. The ends are closed by fitting in pieces of softwood board. If the feeder be made the full length of the shed or stalls, it is not necessary to partition it off between each stall. If it is desired to make the feeder deeper, another board may be added at A—B, but generally speaking a shallow feeder is better for cows, a deep one being liable to damage from the horns of the animals.

TEST THE BULL.

By R. T. McKenzie, Senior Dairy Supervisor.

The real test of a bull's value is his capacity to produce offspring at least not inferior to their dams. As most dairymen depend upon replenishing their dairy herds by breeding and rearing the young stock, the choice of the herd sire is of fundamental importance.

While the herd may be improved from year to year through the bull, retrogression of the herd may take place just as rapidly through the same agency. There is more than one example of many years' improvement having been lost through the introduction of the blood of a poor sire. In choosing a young bull the records of his maternal ancestors should be first considered. These should show consistent producers, and without making it a fetish, type must not be overlooked. He should possess the family traits in order to prevent, as far as possible, variations from characteristics desired in the herd. Constitutional soundness is maintained by adherence to type. When a bull has reached the age of four or five years, besides his breeding and individuality there is another important criteria of his value—that is, his progeny.

A bull that has demonstrated that he can produce offspring equal to or better than their dams is the kind of animal that every breeder requires. Such an animal has a positive breeding value, and is known as a "tested" bull. If used on an average or inferior herd this bull should leave offspring producing more milk and butter-fat than their dams. In other words, he builds up the herd, and his value can hardly be over-estimated.

There is a widespread impression that, when a bull has reached his sixth year, his period of sexual activity is over. However, such is not the case; for, with judicious care, he is fit for service for twelve years or more. In consequence of this belief that the period of usefulness is so short, many a good sire is lost before his real value is known. We have the classical example of this in the often-quoted case of Missouri Rioter 3rd, whose daughters annually produced an average of 2,545

pounds of milk more than their dams, and increased the butter-fat production from 238 to 336 lbs. When the value of this wonderful bull became known, it was found that he had been disposed of to the butcher. A similar case was brought under the writer's notice a short while ago by a Scottish farmer who disposed of a pure-bred Ayrshire bull to the local butcher. At the time of the sale the bull had left some likely looking heifers, but none had been tested for production. After the bull was sold, ten of these calved, and their total average production at the ages of two and three years astonished the owner; for it was found to be as high as 13,102 lbs. of milk and 580 lbs. of butter-fat. On seeing the records, the Scottish farmer realized, when it was too late, the value of that bull.

Almost any pure-bred bull will improve the ordinary grade herd, but once a herd has become highly developed it is only through the introduction of a tested bull that the high standard can be maintained and increased. The writer found in Denmark that the cattle-breeding societies looked askance at any sire which had not demonstrated his capacity to increase the production of the daughters over the dams. We have reached that stage in the dairy industry when the farmer, who desires efficiency cows, must breed them. This can be accomplished only by an intelligent system of breeding and selection. As so often said before, the slogan of the dairy farmer should be, "Weed, breed, and feed."

ORCHARD AND GARDEN NOTES.

E. E. Pescott, F.L.S., Pomologist.

The Orchard.

As a preventive against codlin moth, apple and pear trees should be sprayed with arsenate of lead whenever there is danger from the prevalence of the moth. One of the secrets of success in codlin moth spraying is the destruction of as many as possible of the insects of the first brood. Thus, if particular care is given to the early sprayings, keeping the fruit covered with spray for a month or six weeks after setting, this result is easily accomplished. Some growers prefer to gather all fruit infected by the first brood, spraying only for the second and later broods. Even if all the fruits attacked are gathered, which very rarely happens, the grower suffers from the loss of fruit, which he can ill afford, unless his crop be a heavy one.

Another feature for consideration is the fact that the presence of any arsenical spray on the foliage is responsible for the destruction of the pear and cherry slug, root-borer beetle, and all forms of leaf-eating insects.

Spraying the cherries for the slug will now be necessary. Arsenate of lead may be used, provided the fruit is not far advanced. Hellebore, and also tobacco water, are effective against this pest.

Cultivation.

All orchard soils should be kept well worked during the summer months. It is very essential that the trees should have an abundant supply of moisture during the whole of the growing season. This will mean an increased supply of fruit buds for the next season, consequently the frequent summer cultivation of the soil will be a necessity if the health and vigour of the trees are to be maintained.

Excessive transpiration is often the cause of loss of young trees and of new grafts. They are found to part with a large amount of moisture, and are not able to obtain or retain sufficient for their nourishment; they then very soon wither and die. The soil around these should always be kept well stirred; they may also be given a good straw or grass mulching, and an occasional overhead sprinkling will greatly benefit them.

The planting out of citrus trees may be continued, sheltering the tender plants from winds with hessian or breaks of scrub.

The general aims in summer cultivation should be to maintain a good loose earth mulch during the whole season, and to keep down all weeds and useless orchard growths.

Pruning.

Summer pruning may now be commenced, particularly on apple, pear, and plum trees. The removal or reduction of surplus leader growths, the shortening of unduly long laterals, and the thinning out of crowded shoots, will all tend to strengthen other parts of the tree and to increase the development of new fruit buds.

The Vegetable Garden.

Tomatoes will require much attention at this time of the year. If the plants have been well looked after, they should be making vigorous growth. It will be to advantage to tie the plants to stakes, training them to two or three main growths, and pinching out all laterals as they come.

The plants should be well watered, and occasionally a handful of bonedust and blood manure mixed should be forked in around the roots. Where stable manure is used, it should be used as a mulch, forking it in every three or four weeks, and making a fresh mulch.

All plants of the cucumber and melon family should now be constantly supplied with ample water. Pinch out unnecessary lateral growths, and also the terminals.

The following seeds may now be sown:—French beans, cabbage and cauliflower for winter crops, parsnip, lettuce, and celery.

The side sheets of celery plants should be removed, afterwards earthing up the plants. Asparagus beds should be top-dressed, and allowed to grow without any more cutting. The vegetable beds will need frequent forking and hoeing to keep the soil sweet, and to keep down all weeds.

The Flower Garden.

Plant out dahlias this month; green plants early, and plants grown from tubers later in the month. Water well at planting, and keep well cultivated afterwards.

Rose bushes and beds may be given a good mulch with light stable manure, straw, grass, or lawn clippings. The beds should be kept rather dry, so as to allow the plants to rest before the autumn period of growth.

Sow seeds of cosmos, asters, zinnia, balsams, cockscomb, and other late summer and autumn blooming annuals.

Cut down delphiniums that have yielded their first crop of flowers so as to allow a succession of flowers to come.

Daffodil, hyacinth, tulip, ranunculus, anemone, and other bulbs and tubers may be taken up and stored; while gladioli corms may still be planted.

The garden must be kept well watered and cultivated, so as to tide the plants over the hot and dry season.

REMINDERS FOR JANUARY.

LIVE STOCK.

Horses.—*Stabled.*—Over-stimulating and fattening foods should be restricted. Water should be allowed at frequent intervals. Rub down on coming into stables in an overheated condition. Supply a ration of greenstuff, where possible, to all horses. *Brood mares* should be well fed on succulent food if available; otherwise, oats and bran should be given. *Foals* may with advantage be given oats to the extent of 1 lb. for each month of age daily. Provision should be made for shade shelter for paddocked horses.

Cattle.—Provide succulent fodder and plenty of clean water and shade. Provide "lick" in trough, consisting of salt 20 lbs., lime 20 lbs., superphosphate 5 lb., and sulphate of iron 1 lb. Limewash the cow bails, it helps to keep down flies. Provide calves, if possible, with good grass run, or lucerne hay or oats in a trough. Crushed oats may now be bought for less than 3s. per bushel. This feed is equal to bran as a food for milk production. Now that the Dairy Produce Act is in operation it is necessary to take proper care of milk and cream, as it must be paid for according to its quality. Utensils must be kept clean and well tinned. Cream must be cooled and kept cool and delivered fresh to the factory. Write to the Department of Agriculture for "Hints to Dairymen."

PIGS.—Supply short bedding in well-ventilated styes. Keep styes clean and dry, and feeding troughs clean and wholesome. Sows suckling young should be well fed to enable them to produce plenty of milk. Give young pigs pollard and skim milk in separate trough as soon as they will take it, and keep them fattening from the start to get them off as early as possible. Give a tablespoonful of bone meal or superphosphate per 100 lbs. live weight in food daily. If pigs are lousy, dress with kerosene emulsion or sulphur and lard, rubbing well into crevices of skin, and disinfect styes. Plenty of water should be available for them to wallow in in hot weather.

The automatic feeder described and illustrated in Bulletin 16 is proving a great success.

SHEEP.—The various breeds of ewes come in season approximately during the following months:—Merinoes and comebacks, November and December; Cross-breds, January and February; Pure British breeds, February and March. Be sure of ample rams running with them. Join best rams first. Clean up with those not quite so good. Use only rams with width and substance, and never inferior-fleeced ones. Rams during summer are rarely to be seen working in the day time. It is not always necessary to yard the ewes. Breed from only good-fleeced, roomy, sound-mouthed ewes. Keep in view wool production as well as a shapely, good forequartered export carcass. Meat and fine to medium grade wool will be amongst the foremost commodities in time to come. Two-tooth ewes, if well grown, can be bred from "if they're big enough they're old enough," but they must be well treated throughout. Purgative drenches, worm pills, &c., should be given to any ewes hollow and off their feed, lambs scouring, or grown sheep showing unhealthy discharge, as the cases may be. In persistent instances, the second and third doses. Healthy sheep are rarely fly-blown.

POULTRY.—Separate the sexes; the cockerels should now be fattened and marketed. Grade the young stock according to age and size, otherwise the younger birds will not thrive. Avoid overcrowding. Do not force pullets too much with animal food; build them up with a good variety of food, but avoid maize, and give but little meat. Increase the green food; thoroughly spray houses and perches with an emulsion of kerosene and soapsuds, or a solution of carbolic acid 1 in 60. Keep water vessels in shady spot, and renew water twice daily.

CULTIVATION.

FARM.—Get all crops harvested and stacked as soon as possible. Horse-hoe maize, potatoes and other summer crops. See to insurance of stacks of grain and hay.

ORCHARD.—Keep the soil well scarified and weed free. Cultivate after irrigation or rain. Do not allow the surface to become caked. Spray against codlin moth, pear slug, vine caterpillar, and woolly aphis. Summer prune strong growing shoots and laterals.

VEGETABLE GARDEN.—Plant out all seedlings, when ready, from former sowings. Stir and mulch the surface. Dig each plot as it becomes vacant. Sow seeds of cauliflower, cabbage, peas, French beans, Kohl Rabi, &c.

FLOWER GARDEN.—Keep the soil moist and cool by watering, hoeing, and mulching. Stake tender and lengthy plants. Water and shade young plants. Sow pansy, Iceland poppy, cosmos, aster, &c.

VINEYARD.—Summer bud or *Yema* grafting may be practised in January, though February is the usual month. (See Bulletin No. 35, obtainable on application.) This is the slackest month in un-irrigated vineyards—all ordinary work should be completed before Christmas. It is only exceptional operations, such as scarifying after rain, sulphuring in case of odium, or spraying for downy mildew, that must be carried out. Should heavy rain fall it will be necessary to repeat spraying in order to insure adequate protection The final spraying, to protect foliage, and thus permit fruit to ripen, should be applied in January; the exact date will depend on the weather. In irrigated vineyards the application of water, and the cultivation it necessitates, require attention. Do not neglect to spray thoroughly immediately *before* watering.

Cellar.—Fill up regularly and keep cellar as cool as possible. Towards end of month commence to make preparations for the coming vintage.

BEE-KEEPING.

January being usually the hottest month of the year, combs may melt down on very hot days in hives made out of cases unless they are in some way shaded during the hottest part of the day. If bags are used, they should be removed again as soon as the hot weather is over, because they afford hiding places for bee moths, spiders, and other enemies of bees.

With factory-made or other hives, the walls, cover, and floor of which are of timber not less than ⅞ inch in thickness, there is no need to provide artificial shade, provided the entrance is of sufficient width and the hive of ample capacity to accommodate the bees. The ordinary entrance, which is 5-16 inch deep and the width of the hive, is generally sufficient. It may, however, be enlarged by raising the hive another ¼ inch or so in front should there be much clustering out of the bees.

Top ventilation should not be given; it is not necessary, and the bees dislike it. Bees control the temperature inside the hive by fanning at the entrance and by moistening the combs with water.

During this and the next month bees generally supersede queens in their third year, or which are failing during the second. Queens are sometimes still quite prolific, but by some means the bees know that they would not live through the coming winter, and that it is necessary to raise a successor while drones are still flying, so that the young queen may not remain unfertilized. The queen-cells, which bees construct when superseding, are few—one or two, rarely more. They are generally built on the face of one of the outer combs, often one containing no other brood—not on the edge of a brood comb, as in the case of swarm cells.

Supersedure queen cells must not be mistaken for swarm cells and destroyed, otherwise the hive may eventually become queenless.

All colonies should be examined to see that each has a laying queen. It sometimes happens that the virgin queen of a swarmed stock is lost on her mating flight, and as there is then no young brood in the hive from which to raise another queen, the colony becomes hopelessly queenless. Therefore, whenever neither young brood nor eggs are seen in a hive, a comb of young brood or eggs from some other colony should be given to the bees. If, on examination a few days later, queen-cells have not been raised, then there is a virgin queen in the hive which may be expected to commence laying within a fortnight at the outside.

A BAD BEE-KEEPING PRACTICE.

A recent correspondent inquired whether, if he were to clip virgin queen bees for the purpose of forcing them to become drone layers for the production of drones for mating purposes, would such drones be good enough to mate with other queens?

Let it be said at once that the suggested practice is a very undesirable one. In the first place, if there is worker comb in the hive, the queen will select such comb to lay in, and the drones produced will be undersized; and, if drone comb is used exclusively, the effect will be malnutrition, or undesirable drones of poor stamina. It is almost invariably noticed that, where there are a good number of drones raised as above, the percentage of improperly fertilized queens in the apiary is high. The stamina of the drone bee is, in my opinion, quite as important as that of the queen, and the best drones only should be produced, being raised naturally by the bees under stimulating normal conditions.

A good way to procure early drones is to stimulate by regular feeding a number of the best Italian stocks. The drones from undesirable colonies can be kept down by using for breeding purposes the best worker combs in the hives, and by the use (especially at the time when young queens are due for the mating flight) of drone traps.—*Agricultural Gazette* of New South Wales, June, 1921.

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ULL CALVES are sold for delivery at a month old at prices based proximately on the actual milk and butter fat record of the dam at the rate of 1s. per lb. of butter ***fat*** yielded.

(For Record of Yields of dams see Red Poll Herd Book.)

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LONGFORD MAJOR (Imported)

Dam's Record 14713 lbs. milk ... 6 years average 11338 lbs. milk
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Dam's Record (1st milking) 7144 lbs. milk.

Dam's Dam's	,,	14533 lbs. milk	...	4 years	average	12871 lbs. milk
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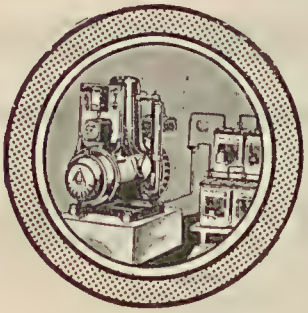
Sire's D. Dam's	,,	9510 ,,	...	12 ,,	,,	8033 ,,
G. Sire's D. Dam's	,,	10215 ,,	...	7 ,,	,,	9386 ,,
G.G. Sire's D. Dam's	,,	12565 ,,	...	10 ,,	,,	8853 ,,
G.G.G. Sire's D. Dam's	,,	10088 ,,	...	2 ,,	,,	9754 ,,

Inspection of the Herd is Invited.

Visitors will be met at the Station on notifying the Manager, State Research Farm, Werribee.

Application for purchase to

Dr. S. S. CAMERON, DIRECTOR OF AGRICULTURE, MELBOURNE.



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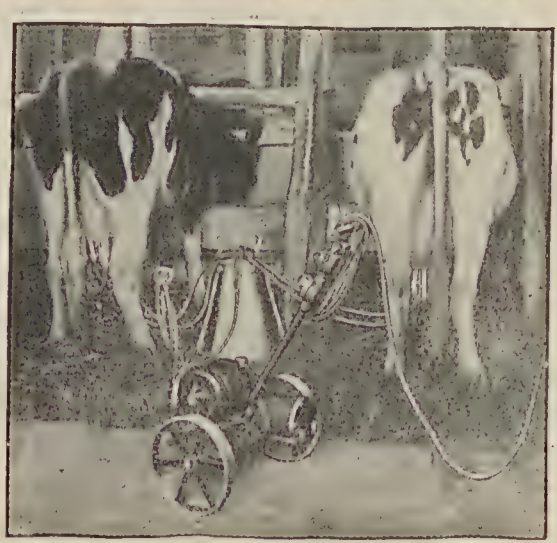

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STATE FARM, RUTHERGLEN

Royal Prince of Gowrie Park

Colour, Brown and White. *Calved 30th July, 1915*

Bred by Mr. W. P. Brisbane, Gowrie Park, Weerite, Victoria.

Pedigree.

Sire: Wallace of Gowrie Park (675) A.H.B. of A.
Dam: Princess of Gowrie Park (1710) by Heather of Jock 2nd (387)
2nd Dam: Princess 4th of Luminous of Oakbank (456)
3rd Dam: Young Princess by Dahlia's Adonis (172)
4th Dam: Princess by Young Norman (225)
5th Dam: Fancy by Earl of Seafield (422)
6th Dam: Princess by Norval.

Princess of Gowrie Park yielded 8,930¼ lbs. milk with a 4·67 test in 273 days.

COLLEGE PRINCE

Colour, Brown and White. *Calved 24th September, 1917*

Bred by Department of Agriculture at the State Farm, Rutherglen.

Sire: Royal Prince of Gowrie Park by Wallace of Gowrie Park (675) A.H.B. of A.
Dam: Irene 2nd of Flinders by Glen Elgin's Combine.
2nd Dam: Irene of Flinders by Gleneira's Monsieur (546)
3rd Dam: Irene of Gleneira (1727) by Majestic of Oakbank (326)
4th Dam: Isabel of Gleneira (1036) by Red Chief (359)
5th Dam: Gaiety (1006) by Dainty Davie.
6th Dam: Princess (270) by Prince.

Irene 2nd of Flinders yielded 570 gallons of milk with a 4·2 test in 304 days.

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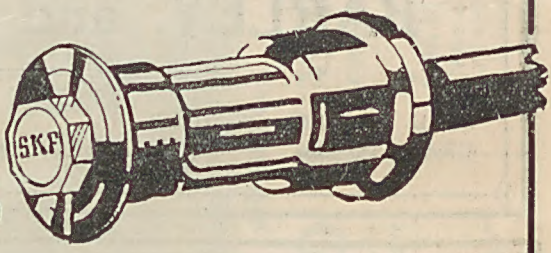

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